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Expansive learning actions for leadership in a teacher training school's Change Laboratory

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ABSTRACT

Drawing from cultural-historical activity theory and the theory of expansive learning, our study investigates an expansive learning process in a Change Laboratory intervention in a Finnish teacher training elementary school, facing a transformational curriculum reform. New subtypes of expansive learning actions and a novel analytical category within expansive learning are induced, employed and discussed for a more nuanced understanding of the learning process in which the participants tackled a contradiction between historically formed individualistic teacher-autonomy vs. collectivistic curricular demands of collaboration and interdisciplinarity. As an outcome, a model of distributed leadership was produced and later implemented as new school practice.

Introduction

Within the dialectical research tradition of cultural-historical activity theory (CHAT), the theory of expansive learning (Engeström, 2015) has become the most prominent learning theory for the study of work and organizations. Applying and refining Davydov's (1990) theory of development and learning based on the dialectical principle of *ascending from the abstract to the concrete*, expansive learning is a collective, non-linear learning process without predetermined goals or end results. Learning is seen as embedded in activity systems of practitioners and driven by historically developed systemic contradictions, inherent in all human activity, and practitioners' attempts to resolve them (Engeström, 2015). Expansive learning by the process of *ascending from the abstract to the concrete* first involves descending from the observable worldly phenomena to a theoretical abstraction, an essence or initial "germ cell" of a new form of activity, and then ascending back to the concrete by enriching the "germ cell" by developing it into new concrete manifestations, i.e., novel practices (see also Blunden, 2021; Davydov, 1990; Engeström et al., 2012).

The process of expansive learning consists of collectively taken specific learning (i.e., epistemic) actions, which constitute learning activity. An ideal-typical sequence of epistemic actions in an expansive learning cycle may be described as follows: *questioning* the current work practices, *analyzing* tensions and contradictions in the work activity, *modeling* a new solution in an observable and transmittable form, *examining the model* to grasp its potentials and limitations, *implementing the model* through practical applications and enrichments, *reflecting* on the learning process and, finally, *consolidating* the outcomes into a new form of practice (Engeström, 2015). The cycle of expansive learning provides an analytical framework for facilitating and analyzing real-life developmental processes in a stepwise manner. While the seven learning actions categorize the most essential aspects and phases of dialectical development, they also allow for more detailed analyses in the form of

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Table 1. Subtypes of expansive learning actions as proposed by Engeström et al. (2013, p. 93).

Expansive learning action	Subtypes of the learning action
Questioning	Q1 - Challenging participants into questioning
	Q2 - Criticizing existing practice
	Q3 - Questioning the proposed development
Analyzing	A1 - Articulating needs and ideas
	A2 - Historical analysis
	A3 - Articulating problems or challenges
	A4 - Identifying contradictions
	A5 - Weighing alternative solutions
Modeling	M1 - Sketching the initial idea of a model
	M2 - Exploiting existing models
	M3 - Naming and defining the model
	M4 - Fixing the model in material or graphic form
	M5 - Varying and adapting the model
Examining the model	E1 - Discussing the model critically
	E2 - Enriching the model
Implementing the model	I1 - Demonstrating implementation
	I2 - Preparing implementation
	I3 - Actual use of the new model (implied)
	I4- Reporting on the use of the new model (implied)

subtypes of learning actions based on their substantive content (i.e., *what* is being questioned, analyzed, etc., and *how*) or transitional "gray zones" between phases of expansive learning.

In a study conducted in a university library, Engeström et al. (2013) identified 17 subtypes (+ two implied subtypes) for expansive learning actions (see Table 1). Following that, very few studies, notably Bal et al.'s (2018) study in a high school "learning lab" intervention project and Augustsson's (2021) small professional development design project involving secondary school teachers, have proposed subtypes of expansive learning actions derived from their data. Like these two studies, our paper takes Engeström et al. (2013) original 17 subtypes (see Table 1) as the starting point of analyzing expansive learning. However, deviating from Bal et al.'s (2018) and Augustsson's (2021) approach, we aim to avoid overlap, e.g., "analyzing actual-empirical" and "identifying problems and the manifestations of the contradictions" (Bal et al., 2018, p. 1026), and categories specific to a single project, e.g., "analysing implemented curricular units" (Augustsson, 2021, p. 14) when defining new categories based on our data. Instead, we seek to enrich Engeström et al. (2013) framework by identifying additional subtypes with generalizable explanatory power, as well as charting the "grey zones" of expansive learning in our data. Moreover, in contrast to the two studies, our data is generated in a Change Laboratory (hereafter CL) intervention, which is a work development method specifically designed to facilitate the expansive learning process in organizational contexts (Kajamaa & Hyrkkö, 2022; Virkkunen & Newnham, 2013).

Theoretical framework

In dialectical tradition, an activity is oriented toward and determined by an object which carries the collective motive of the activity, emerging when human needs and the material-cognitive formations of the world meet (Foot, 2002; Leont'ev, 1978). The theory of expansive learning, thus, views learning as formation of a new, expanded object of activity and production of new activity structures, such as instruments, rules and division of labor, that help practitioners (subjects) master the transition from the previous mode of activity to the new one. This learning process requires collectively charting and traversing a *zone of proximal development* (see Vygotsky, 1978), reformulated by Engeström, regarding collective development of activity systems, as "the distance between the present everyday actions of the individuals and the historically new form of the societal activity" (Engeström, 2015, p. 138) to resolve its inherent contradictions. Furthermore, organizations are typically viewed as constellations of activity systems interacting with neighboring activity systems and their distinct or partially shared objects of activity (Engeström, 2015). This so-called 3rd-generation activity theory (see, e.g.,

Engeström & Sannino, 2010) regards a work community, for example a school, as a network of interconnected activity systems of teachers, principal and other school staff (such as school psychologists and secretaries).

Being a dialectical and dynamic development process, expansive learning does not posit ready-made solutions, but represents a processual approach for examining the systemic nature of local change processes and development efforts. This means rejecting any predetermined goals or objectives as starting points, or directly importing organizational models or solutions from one context to another. Instead, organizations are viewed as unique constellations of activity systems, each in their own phase of development, with specific systemic contradictions, and consisting of a specific array of actors. For educational settings, for example, this means that a new regulatory policy, such as a curriculum reform, will aggravate different kinds of challenges and prompt different kinds of needs for change and learning (Hedegaard, 2020). The developmental potential of a school organization, articulated through its collective zone of proximal development, can thus be understood by analyzing the relations and dynamics of its multiple interconnected activity systems, such as instruction and school leadership, as they engage with their challenges.

To initiate problem definition and to enable practice transformation, the multiple activity systems must be brought together and "pushed into motion." System-level, bottom-up transformations do not take place in static, contented situations because they specifically require a motivation to "move beyond" or "break away" (see Hopwood & Sannino, 2023; Virkkunen, 2006) from the current problematic circumstances. In exploring expansive learning actions and their subtypes, attention should therefore be directed to participatory methods of work development, which promote collective analysis of the interaction and contradictions specific to the context in question. Such methods are pivotal for facilitating expansive transformations in which the community of professionals learns to widen its possibilities for action by redesigning its own activity. Using the CL method has allowed us to study the teacher training school organization as a constantly evolving expert community and a unique professional context, while its development reflects the broader cultural-historical shifts in the Finnish schooling system (see Miettinen, 2013; Turner et al., 2018).

CL is a CHAT-based, research-assisted workplace intervention method specifically designed to accelerate the dialectical process of expansive learning (Sannino et al., 2016; Virkkunen & Newnham, 2013). It has been used in various educational contexts to transform local practices in a bottom-up developmental process (e.g., Engeström et al., 2002; Hyrkkö & Kajamaa, 2021; Morselli, 2021; Sannino, 2008). The CL employs a set of instruments and a dedicated space (see Figure 1) for the analysis of contradictions and innovating new practices. The "mirror" board is used for so-called mirror data, to stimulate reflection and reveal conflicts of motives in the work community. The "models and visions" board is used for providing theoretical and conceptual tools (such as the activity system model and the cycle of expensive learning shown in Figure 1) to facilitate practitioners' deepening systemic analysis of their activity. The "ideas and tools" board is reserved for collectively ideating new concepts and forms of activity by the practitioners (Virkkunen & Newnham, 2013). In the CL process, needs, goals or outcomes are not predetermined. Instead, they are defined by the participants as they negotiate and construct expansive solutions, such as new organizational models, to the underlying contradictions in their activity systems (Engeström & Sannino, 2010, 2011).

When analyzing expansive learning on the level of discourse and individual learning actions, the relation of these to the broader expansive transformation of the studied context should always be considered (Engeström, 1999). In the present study, the CL was used for both 1) helping the school community find solutions for problems in their daily work and 2) collecting data and analyzing the expansive learning actions, which in our case took the form of developing a new distributed leadership practice for the school. In analyzing the CL process in retrospect, we therefore focus on problems and conflicts experienced by the participants in their work, and how they, through jointly taken expansive learning actions, created tentative resolutions to the problems, especially from the viewpoint of distributed leadership.

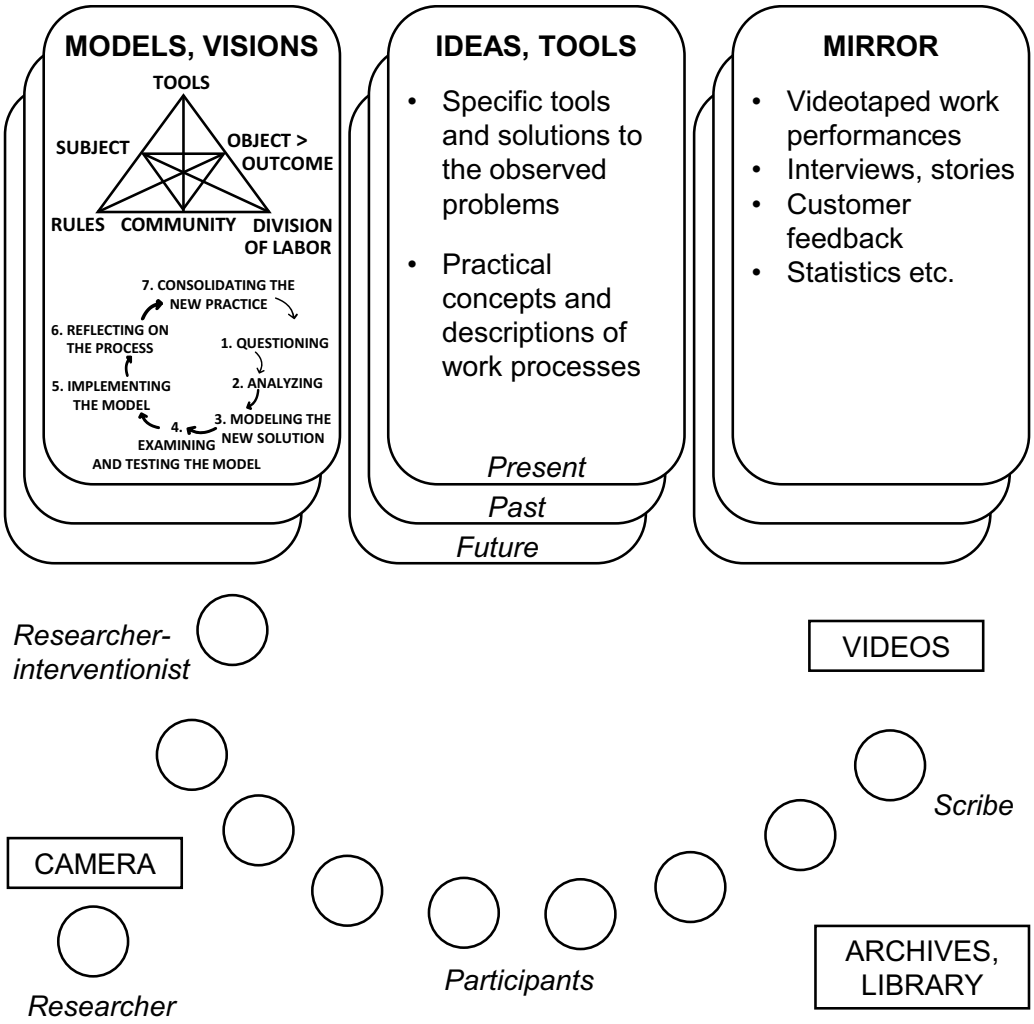


Figure 1. Prototypical layout of the Change Laboratory space (adapted from Kajamaa & Hyrkkö, 2022).

Our results are presented in two parts: first, a detailed analysis of expansive learning actions and their subtypes throughout the CL intervention; and second, an analysis of how the expansive learning process, detailed in the first part, led to the modeling of distributed leadership in the teacher training school in focus. Our activity-theoretical approach and the CL method allow us to extend our examination from local organizational transformations into the cultural and historical development of the school system and the systemic contradictions related to this (Engeström, 2015). By analyzing and resolving the contradictions through an expansive learning process that produced a novel distributed leadership practice, the teacher-practitioners were in fact tracing the developmental logic of the concept of distributed leadership and envisioning its potential future manifestations in their own work. As our research questions, we ask:

(1) Which expansive learning actions and their subtypes were identified in the CL data and how were they distributed across the CL sessions?
(2) How did the expansive learning actions and their subtypes contribute to the formulation of a new practice of distributed leadership?

Materials and methods

Research context

Our research took place in a Finnish teacher training school, which is also a pioneering university-level research and development unit in the country, with nearly 1,000 students, 250 teacher trainees, and 110 staff. In addition to providing education for the local children, the school's three special duties were teacher trainee supervision, research, experimentation and development activity, and continuing education of in-service teachers. This four-fold object of the work community's activity made this school a particularly interesting context for an activity-theoretical intervention study, as the school's various activities were oriented toward their specific objects, while the more general shared object of activity (pupils and their learning) had become unclear.

The need for organizational change, as well as the need for conducting a CL at the school to support this, was aggravated by an upcoming nationwide basic education curriculum reform of 2016, a top-down regulatory process, which was about to be undertaken by this school as a pilot school in Finland. The reform required the teachers, with a high degree of autonomy in their work, to apply more collaborative and interdisciplinary practices in planning and executing instruction, crossing the traditional boundaries of the teacher community and individual teachers' work. With limited organizational structures in the work community to support the change, the teachers were experiencing various problems in their daily work.

Data collection: conducting the CL intervention

A CL intervention, involving 12 teachers (ten "senior teachers," having worked at the school for more than a year and two "new teachers") and a principal, was carried out by our research group (led by the second author of this article, while the first author did not take part in conducting the intervention) at the elementary school section between 2015 and 2016 to locally support and to study the implementation of the new curriculum. Applying the CL method, our research started with an ethnographic study of the school to foreground the main part of the intervention. The main intervention then comprised six CL sessions held on a weekly basis in the school premises between April and May 2015. Video recordings of these six sessions are used as primary data for the present study. The sessions lasted between 93 and 103 minutes and were attended by between 6 and 9 of the 13 participants. The sessions were videoed with two cameras on opposite sides of the meeting room. The video recordings were transcribed verbatim, resulting in 276 pages of transcription consisting of 4,594 speaking turns. Table 2 provides an overview of the sessions, discussion topics and mirror data of this study. After the CL sessions, implementation of the intervention's outcomes was traced through a follow-up session and staff interviews from February 2016 to February 2017.

Data analysis

As our first analytical step, we analyzed the entire video data for expressions and actions, which we interpreted as expansive learning actions, i.e., epistemic actions that constitute the expansive learning activity (Engeström, 2015; Engeström et al., 2013). Our starting point was the detailed, yet general, framework of subtypes of expansive learning actions (see Table 1) proposed by Engeström et al. (2013). Our unit of analysis was a sequence of interaction in which a single idea or initiative is articulated. We traced sequences that reflected the participants' preliminary, intuitive understanding (see Bratus & Lishin, 1983) of the central contradiction underlying the surface-level problems (disturbances) of the work activity (see Engeström & Sannino, 2011) and aggravated by the curriculum reform.

Furthermore, we defined a sequence of interaction as containing no more than one expansive learning action. A "sequence" is thus different from a speaking turn and could last from a few words to a lengthy monologue, or even a dialogue among multiple participants. Also, physical actions, such as gesturing or drawing could be coded as sequences of interaction potentially containing an expansive

Table 2. Overview of the Change Laboratory sessions, discussion topics and stimuli.

	Length	Attendees	Main discussion topics	Mirror data and stimuli
Session 1	93 minutes 575 speaking turns	2 new teachers 6 senior teachers	• Introduction to the CL method and theory of expansive learning • Voicing tensions and challenges in the current activity	• Overview of the CL process
Session 2	103 minutes 564 speaking turns	1 new teacher 7 senior teachers 1 principal	• Problems of individualistic, "strong" instructional leadership • Need for a shared direction and collaboration • Historical development of the school organization and its leadership	• Images of CL layout and expansive learning cycle • Summarizing points and video clips (6 min) from session 1 • Homework for participants: list positive and negative examples of collaboration and interaction
Session 3	98 minutes 590 speaking turns	1 new teacher 6 senior teachers 1 principal	• Possibility of a shared vision for the elementary school • Preliminary ideas for organized collaboration	• Image of expansive learning cycle • Coordination and cooperation interaction models & hypothesis • Video clips (6:30) from session 2
Session 4	95 minutes 592 speaking turns	2 new teachers 4 senior teachers	• Historical analysis of the current school organization and activity • Teams as a tool for collaboration • Steering group as a potential new leadership structure	• Historical timeline of the school's development (compiled by the research team and supplemented by participants) • Video clips (8 min) from session 3
Session 5	98 minutes 782 speaking turns	1 new teacher 7 senior teachers 1 principal	• Roles and responsibilities of teacher teams and steering group • Reflection of earlier practices • Voicing the need for a concrete model	• Video clips (4 min) from session 4 • List of task-based teacher teams currently in place at the school (brought by the principal)
Session 6	93 minutes 1491 speaking turns	1 new teacher 5 senior teachers	• Incorporating earlier ideas into model drawings • Teamwork and leadership structures, roles and responsibilities	• Slide summarizing the main discussion points from session 5 • Model, five versions (drawn by the participants) • Reflective communication model

learning action. The sequences containing an expansive learning action were coded for the action and its subtype using the data analysis software Atlas.ti 9. Subtypes were identified based on significant "epistemic differences within expansive learning actions" (Engeström et al., 2013, p. 92), e.g., categorizing *Examining* actions as either "discussing the model critically" or "enriching the model," see Table 1. Our data include a total of 420 coded sequences containing an expansive learning action and its subtype. As a result of this first step, we enriched Engeström et al. (2013) framework by inductively identifying four additional categories that emerged from our data, which we named as 1) *Conceptual analysis*, 2) *Planning the components of a model*, 3) *Testing the model with stimulation*, and 4) **Initial ideas of how the activity should be organized* (hereafter **Initial ideas*) as a novel analytical category within expansive learning[1] (for detailed descriptions, see Appendix).

As our second analytical step, we studied the expansive learning actions and their subtypes from the point of view of how the model of distributed leadership was discovered and formulated by the CL participants. We analyzed the expansive learning process through the lens of 3rd-generation activity theory as concerning multiple interconnected activity systems and their boundaries within the school organization. By retrospectively approaching the expansive learning actions and their subtypes, detailed in our first analytical step, we traced the development of the distributed leadership model from the first *Analyzing* actions that laid the groundwork for ideating the new conception of leadership to **Initial ideas* actions for envisioning the manifold possible ways of organizing the school's

practices, to *Modeling* actions in which a new mode of activity was ideated and concretized as a tangible model drawing and, finally, *Examining the model* actions in which the model was enriched into concrete manifestations, representing the practical organizational infrastructure and relationships based on the model.

In this step, we paid attention to expressions that conveyed the participants' thinking about school leadership and how it developed during the CL. These included issues such as making mandates for decision-making (or expressing a need for a mandate), challenging existing power relations, questioning current scheduling and time allocation, or ideating improvements for the division of duties and responsibilities, clarifying roles and tasks, or enhancing communication. Through these kinds of expressions, the participants reached out across the traditional organizational boundaries (i.e., activity systems of leadership and instruction), paving the way for a new distributed leadership practice.

Results

In this section, we first present our results regarding the progress of expansive learning, focusing specifically on the newly identified subtypes of expansive learning actions, and the new analytical category **Initial ideas*, thus answering our first research question. Second, we describe the expansive learning process from the point of view of the emergence of a conception of distributed leadership and its enrichment into a new local leadership practice.

Specifying and employing an extended framework of expansive learning actions

The progress of expansive learning in the CL is quantitatively summarized in Table 3. It employs the expanded framework of learning action subtypes derived from Engeström et al. (2013), complemented with our three new subtypes (namely, category A6, *Conceptual analysis*, category M1, *Planning the components of a model* and category E1, *Testing the model with simulation*) and the new category within expansive learning (**Initial ideas*), derived from our CL session data.

Table 3 illustrates that the discussion of present challenges of the work activity was interpreted by us mostly as the learning action of *Questioning* (categories Q1–Q3 in Table 3). To gain a more nuanced understanding of this learning action, the actions were grouped under three subtypes, namely: *Challenging participants into questioning* (Q1), *Criticizing existing practice* (Q2) and *Questioning the proposed development* (Q3). Table 3 also shows that nearly all occurrences of the subtype *Questioning the proposed development* (Q3) took place in the first session (more specifically, during the first 21 minutes of group discussion), while occurrences of the other two subtypes (Q1 and Q2) were more prominent also in subsequent sessions. This illustrates the readiness of the participants to redirect their criticism from the intervention process toward their own work practices.

In the first session already, several *Analyzing* actions (categories A1–A6 in Table 3) took place, as the participants articulated needs and ideas for change, analyzed the historical background of the perceived disturbances and – already in this very early stage – attempted to identify the systemic nature of the problems they were experiencing. A closer look at Table 3 reveals that *Conceptual analysis* (category A6), the new *Analyzing* subtype derived from our data, was mostly carried out in the third session, while *Weighing alternative solutions* (category A5) chiefly took place in the fifth session, illustrating the variety of ways in which the participants carried out the *Analyzing* learning action, and how this evolved as expansive learning progressed during the CL.

Most *Modeling* actions (categories M1–M6), as well as the *Examining* (categories E1–E3), *Implementing* and *Reflecting* actions, were identified in the final sixth session. In this session, the participants drew up the distributed leadership model to summarize their ideas for organizational structures and practices thus far, proceeded to refine and discursively test the model, and finally reflected on the CL process. As a notable exception, the new *Modeling* subtype derived from our data, *Planning the components of a model* (M1), already began to appear in the fourth session. However, this action was most prevalent in the fifth session in which various organizational structures and their roles

Table 3. Subtypes of expansive learning actions identified in the CL. Number of occurrences, and proportion of occurrences of the same subtype. Darker hue indicates larger proportion.

	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Totals
Q1 - Challenging participants into questioning	**4**	**1**	**4**				**9**
	44.4%	11.1%	44.4%				100%
Q2 - Criticizing existing practice	**20**	**6**	**1**	**5**	**3**		**35**
	57.1%	17.1%	2.9%	14.3%	8.6%		100%
Q3 - Questioning the proposed development	**9**	**1**	**1**				**11**
	81.8%	9.1%	9.1%				100%
A1 - Articulating needs and ideas	**5**	**11**	**13**	**7**	**7**		**43**
	11.6%	25.6%	30.2%	16.3%	16.3%		100%
A2 - Historical analysis	**7**	**11**	**4**	**6**	**7**		**35**
	20.0%	31.4%	11.4%	17.1%	20.0%		100%
A3 - Articulating problems and challenges	**4**	**5**	**9**	**5**	**9**		**32**
	12.5%	15.6%	28.1%	15.6%	28.1%		100%
A4 - Identifying contradictions	**8**	**3**	**3**	**5**	**6**	**1**	**26**
	30.8%	11.5%	11.5%	19.2%	23.1%	3.9%	100%
A5 - Weighing alternative solutions	**2**	**5**	**13**	**12**	**30**	**2**	**64**
	3.1%	7.8%	20.3%	18.8%	46.9%	3.1%	100%
A6 - Conceptual analysis		**8**	**12**	**2**	**4**	**1**	**27**
		29.6%	44.4%	7.4%	14.8%	3.7%	100%
*Initial ideas of how the activity should be organized			**9**	**5**	**7**	**3**	**24**
			37.5%	20.8%	29.2%	12.5%	100%
M1 - Planning the components of a model				**6**	**22**	**9**	**37**
				16.2%	59.5%	24.3%	100%
M2 - Sketching the initial idea of a model						**7**	**7**
						100.0%	100%
M3 - Exploiting existing models						**12**	**12**
						100.0%	100%
M4 - Naming and defining the model						**1**	**1**
						100.0%	100%
M5 - Fixing the model in material and graphic form						**1**	**1**
						100.0%	100%
M6 - Varying and adapting the model						**8**	**8**
						100.0%	100%
E1 - Testing the model with simulation						**5**	**5**
						100.0%	100%
E2 - Discussing the model critically						**9**	**9**
						100.0%	100%
E3 - Enriching the model						**17**	**17**
						100.0%	100%
I1 - Demonstrating implementation						**2**	**2**
						100.0%	100%
I2 - Preparing implementation						**7**	**7**
						100.0%	100%
Reflecting on the process						**8**	**8**
						100.0%	100%
Total occurrences	**59**	**51**	**69**	**53**	**95**	**93**	**420**

were verbally ideated, prior to drawing the model, with emphasis on *Weighing alternative solutions* (A5) and *Planning the components of a model* (M1) actions.

During the sixth session's intensive *Modeling* (see Table 3), the participants drew four consecutive iterations of the distributed leadership model. The drawings were taken up in the process as mediating artifacts, providing the group with the necessary conceptual tools to further develop, simulate and finalize their ideas of teamwork and distributed leadership. Manifested in *Examining the model* actions (categories E1–E3), this included making mandates for and distributing decision-making, clearly defining roles, tasks and time allocation for various school duties, and enhancing communication between the newly established teacher teams, principals and steering group (i.e., a small group consisting of teacher team leaders, to aid the information flow between the teachers and the principals).

Our abductively constructed sub-typification of expansive learning actions depicted in Table 3 elaborates the collective expansive learning process, offering an ample view of intricacies and subtle movements within and between the expansive learning actions. Next, we describe how we identified the new subtypes *Conceptual analysis* (A6), *Planning the components of a model* (M1) and *Testing the model with simulation* (E1), as well as the new category **Initial ideas* in our data.

Conceptual analysis (A6) subtype

Our examination of the *Analyzing* actions in the second and third CL sessions led us to define a new *Analyzing* subtype, *Conceptual analysis* (A6). We defined this as analysis of the work activity on a conceptual level, "what are we talking about when we say X," and analysis of communication and process. In this subtype, the participants discussed the purpose of the school more profoundly than previously during the CL: *"As to why we work here: there are probably two main things. First is teaching pupils and their learning, and second is trainee supervision and teacher education. And all the research, experimentation and development is entwined around those, and people do them in their own way."* (Senior teacher, 3rd session).

Conceptual analysis started to emerge during the second session, but was most prevalent in the third session. From a systemic point of view, the discussion identified as *Conceptual analysis* in the third session revolved around the object of activity, voiced by the participants as "pupils and their learning." For the first time in the CL, this existential purpose of the school was raised as a focal talking point, instead of the teacher's individually perceived objects of activity, or their personal experiences of everyday organizational problems. *Conceptual analysis* thus played a key role in enabling this crucial step toward the conceptualization of a shared object in the expansive learning process, with the previously discussed organizational problems gaining a new developmental orientation, in other words, a "motivating force that gives shape and direction to activity" (Engeström, 2008, p. 89).

**Initial ideas of how the activity should be organized*

With a tentative idea of a shared object of activity being established in the third session, the expansive learning process next appeared in forms which we struggled in our analysis to define as either *Analyzing* or *Modeling*. After initially coding these sequences as *Modeling* due to their forward-looking and concrete nature, we decided during a revision to tentatively re-group them under an analytical category of their own, naming it **Initial ideas of how the activity should be organized* (or **Initial ideas*). Neither can they be described as so-called non-expansive learning actions (see Engeström et al., 2013) because they nevertheless proved to play an essential role in the expansive learning process.

We recognized these sequences from the third session onwards as we identified discourse in which the participants, relying on earlier *Analyzing* actions, took steps toward concretizing their transformative ideas, albeit not perceiving them as such being a part of any kind of a systemic structure or model. One such occurrence was the discussion about teams and teamwork: *". . .to make this teamwork function properly ... the teams should have power to make decisions ... not just debating for fun. And one should define what they are supposed to talk about. ... I'm just trying to concretize here."* (Senior teacher, 3rd session). In this passage, the teacher is quite aptly trying to "concretize" ideas, bringing issues such as decision-making, leadership and responsibility into the discussion, yet without any notion of a tangible model of the new activity.

As a continuation to the *Conceptual analysis* expressions (see above) identified in the second and third sessions, **Initial ideas* expressions were also connected to talk about the newly conceptualized shared object of activity, "pupils and their learning." Participants were beginning to perceive school-work as a systemic activity, and problems related to its elements were discussed in an analytical and change-oriented manner. Consequently, the previously articulated disturbances were increasingly being examined as historically emergent and systemic phenomena and reflected "through the object," rather than as organizational or individual problems that the teachers had earlier felt they could not affect.

Initial ideas actions could be described as tentatively probing into a potential emerging model of a renewed activity, but also probing into the practical consequences of such a model (*"teams should have power to make decisions,"* see above), i.e., imagining the concrete manifestations of the model as potential new practices. We interpret this as reaching forward from a yet abstract level toward the concrete potentials of a to-be-transformed activity. As such, it is a revealing empirical testimony of exploring the school's collective *zone of proximal development* (Engeström, 2015; Vygotsky, 1978) for practice transformation. In the **Initial ideas* actions, a realization was emerging that the school community would need to cross this distance in order to transcend the systemic contradiction of schoolwork (i.e., between the historically formed strong teacher-autonomy and the collaboration and interdisciplinarity required by the administratively imposed curriculum reform) that was, at this point of the intervention, being implicitly analyzed by the participants.

Planning the components of a model (M1) subtype

When the principal, participating in the CL, had in the third session expressed a mandate for transforming the school's leadership structure, the possibility of creating a model to depict the new organization of tasks and duties entered the discussion. This was especially evident from the fourth session onwards, as components of a yet undefined model were discussed: *". . .I think we should have a steering group. Should we even have one for elementary level and one for secondary level, or just one for both? ... like you said ... the steering group member was in that team and he knew what was being discussed. So it's not vague, like 'talk about recess time rules' ... but a clear task."* (Senior teacher, 4th session). This discourse, in which organizational actors and their duties were discussed in detail, was interpreted as representing the first *Modeling* actions, even before a tangible model was created. We therefore named this subtype *Planning the components of a model* (M1).

Like the **Initial ideas* actions described above, during our first coding we struggled to define these actions as either *Analyzing* or *Modeling*. They did not fit the common definition of *Modeling* involving a tangible, observable and transmittable medium, such as a drawing. However, actions like these were clearly distinct from earlier *Analyzing* actions in that they were aimed at producing concrete transformations in the school. They were also distinct from the **Initial ideas* category in that they dealt with actual components of a (yet implicit) model. During a revision of our coding, we decided to define these actions as a new, purely discursive subtype of *Modeling*, distinct from other *Modeling* subtypes in which drawing or sketching was involved.

Remarkably, if the new **Initial ideas* category and the new *Modeling* subtype *Planning the components of a model* (M1) were not employed, and these actions would simply have been categorized as *Analyzing*, we would have ended up with a very different result regarding how the *Modeling* process unfolded already in the third session, but especially the fourth and fifth sessions (see Table 3). In the CL, the "traditional" kind of pen-and-paper modeling only took place in the sixth session; yet we felt that *Modeling* as a learning action could be conceptualized more broadly, also considering the discursive and mental, not only the tangible, ways of forming systemic explanatory relationships. In other words, our empirical data compelled us to broaden and elaborate the definition of *Modeling* to more precisely and comprehensively explain the expansive learning that took place in our CL.

Testing the model with simulation (E1) subtype

These subtypes were identified toward the end of the sixth session as new practices were innovated, mediated by the final version of the distributed leadership model (see Figure 2 below). They complemented the other two *Examining* subtypes – *Discussing the model critically* (E2) and *Enriching the model* (E3) – by acting as a discursive test-bed for running various daily tasks with the model to find out if the earlier disturbances would be resolved. These subtypes often appeared in a dialogue involving several teachers, as in the example given in the following section.

Learning actions for a new distributed leadership practice

In the sixth session, the group started to draw a model picture to give a tangible form to ideas articulated in previous sessions, especially associated with the **Initial ideas* and *Planning the components of a model* (M1) learning actions. The co-creative drawing process involving four preliminary model versions, each building on the previous one and incorporating new ideas into the design has been documented in detail elsewhere (see Hyrkkö & Kajamaa, 2021). For the present paper, we focus on the final version, named by the participants as the "compass model for shared instructional leadership" (see Figure 2), and the process of taking it up as a mediating instrument for detailing the concrete manifestations of the model, the new practices that would help the work community to move beyond the contradictions.

Table 3 shows that, during the sixth session's modeling process, the most prominent *Modeling* action subtypes were *Planning the components of a model* (M1, 9 instances), detailing the various components of the different versions of the model, not yet put on paper; *Sketching the initial idea of a model* (M2, 7 instances), the tentative, cooperative sketching and simply setting down the first ideas; *Exploiting existing models* (category M3 in Table 3, 12 instances), using the earlier iterations of the model as sources of ideas; and *Varying and adapting the model* (M6, 8 instances), making adjustments to the model versions and planning the next iteration.

A turning point in the creation of the model was when one of the researchers offered a metaphorical "compass" as a conceptual stimulus for summarizing the teachers' earlier ideas about dynamic participation in decision-making: *"Is that like a pedagogical compass then, like it's dynamic? So, it's not a model like this* [gesturing up-down], *but it moves like this* [gesturing circular movement]?" (Researcher, 6th session). The participants immediately took up the compass metaphor and connected

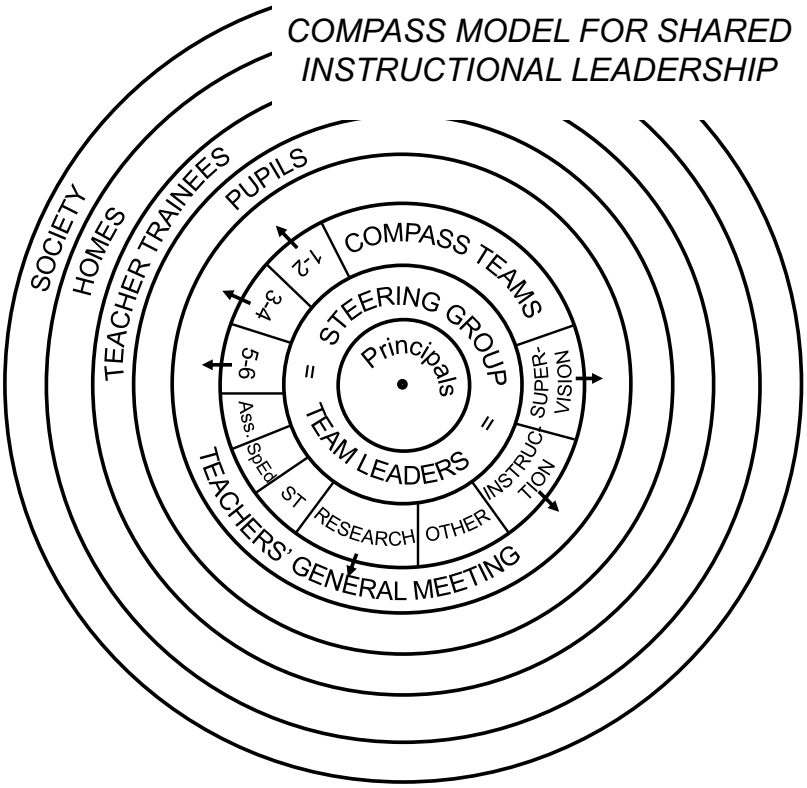


Figure 2. Reproduction and English translation of the final version of the model, drawn by the participants in the sixth CL session.

it to issues related to the distribution of leadership, initiating the teachers' joint drawing of the final version (see Figure 2), quickly dubbed a "compass model" with teacher teams named as "compass teams." At the heart of the model was the voluntary participation of teachers in teams dedicated to developing the teacher training school's various tasks ("RESEARCH," "SUPERVISION" and "INSTRUCTION" in the model), as well as matters of basic education per grade levels. Teaching assistants, special education teachers and subject teachers also had their own teams, depicted in the model. Overall, these "compass teams" were to prepare initiatives related to their specialty, which would be discussed and approved monthly by the teachers' general meeting. The role of the principal was to participate in team meetings when needed and be informed about the teams' duties by the instructional steering group, a new organizational entity ideated during the CL, consisting of teacher team leaders and the principal. At this point of the CL, the model represented a working hypothesis, in constant refinement, of the school community's zone of proximal development and an emerging mediating instrument for traversing it.

While the main components – grade-level teams, specialized teams and instructional steering group – were already ideated during the fourth and fifth sessions (chiefly through **Initial ideas* actions and *Planning the components of a model* (M1) actions), the distribution of their exact duties and decision-making mandates took place when the final model was drawn and learning actions identified by us as *Examining the model* took place. Especially plentiful was the *Enriching the model* (E3, 17 instances) subtype, for detailing the duties and responsibilities of various components, and *Discussing the model critically* (E2, 9 instances), supporting the enrichment through critical analysis. Meanwhile, *Testing the model with simulation* (E1, 5 instances), a new subtype identified in our data, was important for preparing the concrete manifestation of the model by verbally running through various real-life scenarios to reveal potential weaknesses and to see how the new mode of work and distributed leadership would suit actual needs. Below is an example from the sixth session in which the participants, both senior (ST) and new (NT) teachers, discuss new ways to plan teacher trainee supervision development, mediated by the model drawing:

> ST1: So here's the supervision team, let's say us who've been doing it, Polly, me and Anna – if we mull over those models. And then we bring them to you, to these teams [pointing at grade-level teams] for processing. And the teams bring them back to us, and then we take them to the general teachers' meeting for joint discussion. Or then . . .
>
> NT1: [interrupting] Or then they would come from grade teams to here [pointing at teachers' general meeting]. Then they would make the final polishes . . .
>
> ST1: [interrupting] Yeah, or then they, yeah. Or it would come from teams to the general teachers' meeting, and we would decide there.
>
> ST2: That's what I've been thinking.
>
> ST1: That way it would work, it would be easier.

In a direct and overlapping continuum to this testing and enriching of the model, *Implementing* learning actions were identified by us as utterances committing to the uptake of the new model by planning specific future tasks in line with the model. Note, however, that the model would not be actually implemented in practice until after 3 months, at the start of the next semester. Finally, the last minutes of our CL data feature several *Reflecting on the process* actions, as the participants critically reflected on the entire CL process and its outcome.

Practical and conceptual charting of the potentials of distributed leadership

The four-field model in Figure 3 depicts how the participants gradually began to conceptualize and interpret the central contradiction underlying their activity, namely that between the historically formed strong teacher-autonomy (the principle of individuality) and the administratively imposed curriculum reform requiring the uptake of collaborative and interdisciplinary practices in both instruction and in

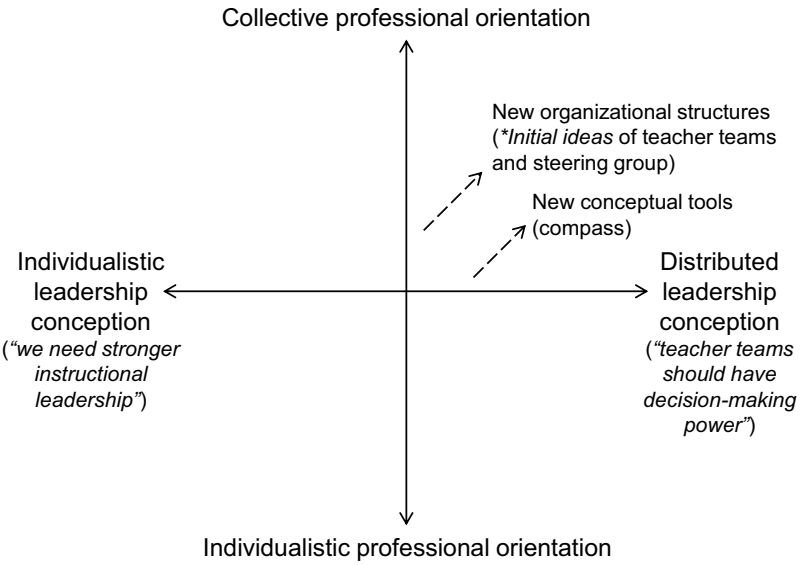


Figure 3. Four-field model depicting the charting of a collective zone of proximal development for resolving the central contradiction of teacher-autonomy vs. administratively imposed collaboration and interdisciplinarity.

other tasks of the school (the principle of collectivity). The starting point of the group, at the beginning of the CL, was a remarkably individualistic professional orientation, showing up as emphasizing personal work histories and expertise especially by the senior teachers: *"…I've been here so long, this has always been a problem in our work community … "* (*Criticizing existing practice* (Q2), Senior teacher, 1st session). The counterpart of this orientation was an individualistic conception of leadership: at first, *"a strong pedagogical* [instructional] *leader"* (*Criticizing existing practice* (Q2), Senior teacher, 1st session) was seen by many of the teachers as a solution to the school's problems. It was the principal himself who broke this dynamic by denouncing the idea of authoritative leadership as a solution: *"…What is strong pedagogical leadership, what does it mean in practice? And is it a positive thing, the 'strong'?"* (*Conceptual analysis* (A6), Principal, 2nd session). Instead, the principal opened a discussion about how teachers themselves – as the best professional experts – could be involved in all decision-making. This statement was a critical springboard, which opened both the horizontal aspect of individualistic vs. distributed leadership conception and the vertical aspect of individualistic vs. collective professional orientation (see Figure 3), while, importantly, not denying teacher-autonomy.

After this, the rest of the CL can be regarded as a process of navigating across this four-field from the bottom-left corner toward the top-right corner, with multiple detours and obstacles on the way. A collective zone of proximal development toward this new mode of action was most prominently articulated through the multiple **Initial ideas* actions from the third to the sixth session (see Table 3). An essential aspect of these actions, linking them to the emerging new distributed conception of leadership, is the purposeful intention of the participants to reorganize the entire constellation of the school's interconnected activities, thus crossing their boundaries. When the teachers actively engaged in ideating how the school's activities should be organized in the future, they gained agency over their work and simultaneously began to embody and materialize the distributed conception of leadership (in effect, doing leadership tasks) into a practice. By doing so, they also gradually shifted from individualistic to collective professional orientation, taking responsibility for not only the development and change of their own work, but the systemic transformation of the activities of the entire school community.

Another important aspect of this journey was the adoption of a conceptual stimulus offered by a researcher, the notion of "compass," as a generative metaphor for expanding the school's leadership practice. Importantly, the metaphor was not left on the level of a figure of speech, but was instead used

by the participants as a mediating concept for transforming their activities. After the metaphor was taken up by the participants at 56 minutes into the sixth session, we solely identified various subtypes of *Modeling* actions (see Table 3) as the teachers swiftly and jointly drew the final "compass model" (see Figure 2) as an explicit tangible model reflecting the new hypothetical practice.

After the model was drawn, the participants immediately took up the picture as a mediating instrument for constructing concrete manifestations of the new mode of action as described above, thus *ascending to the concrete*. During these *Examining the model* actions, the model functioned in a generative way, constantly producing new innovations for the activity, new tentative practices and new ways to distribute leadership and other core duties. This development took place through several consecutive and cyclical realizations of the learning action subtypes *Testing the model with simulation* (E1), *Discussing the model critically* (E2) and *Enriching the model* (E3). The compass model was implemented as the school's new distributed leadership practice in the following fall term.

Discussion

Our study of a Change Laboratory (CL) intervention introduces significant insights into the development of a new distributed leadership practice through expansive learning. Although leadership plays a central role in educational settings, our work is one of the first to focus explicitly on expansive learning actions and their subtypes within this context. Our analysis of the CL data revealed a process of expansive learning, unraveling through learning actions taken by participants, to identify and move beyond systemic contradictions, specifically the central contradiction between the individualist teacher-autonomy and collectivist collaboration and interdisciplinarity, administratively imposed in a curriculum reform. Through expansive learning, this contradiction was effectively addressed by our CL participants by creating a "compass model" of distributed leadership, which facilitated the formulation of new organizational structures and practices, fostering a collective approach to teaching and leadership while balancing with teacher-autonomy.

Our findings highlight the importance of recognizing epistemically differentiated subtypes of expansive learning actions when discursively analyzing expansive learning processes. The three newly proposed subtypes for *Analyzing*, *Modeling* and *Examining* actions and the novel **Initial ideas* category, detailed in our analysis, may constitute analytical categories with explanatory power for future studies in varying contexts, thus potentially refining the theory of expansive learning (Engeström, 2015; Engeström et al., 2013). Taking an approach different from Bal et al.'s (2018) and Augustsson's (2021) analyses, creditable as they are in their own right, we aimed to avoid classificatory labeling of subtypes with context-specific topics and partly overlapping categories. Instead, our abductively acquired definitions are based on how the newly identified subtypes, in a more general sense, represent a broader understanding of both individual expansive learning actions and the gradual transitions and "gray zones" between learning actions. As such, our definitions are to be taken as working hypotheses of potentially general new categories.

For example, the **Initial ideas* category, roughly following the *Analyzing* actions and foreshadowing the emerging *Modeling* actions, allowed us to empirically trace the discursive traversing of the collective zone of proximal development (Engeström, 2015; also, Vygotsky, 1978) within the dialectical process of expansive learning. While the **Initial ideas* category may be specific to our context, especially regarding its conceptual linkage to the emergence of distributed leadership in our data, future studies can validate its broader applicability. On the other hand, the new category *Planning the components of a model*, as a subtype of the *Modeling* learning action, breaks new ground by conceptualizing *Modeling* actions as not only physically reproducing a model "in some publicly observable and transmittable medium" (Engeström, 2015, p. xxi), but also as discursive and conceptual modeling. Along with the newly found *Analyzing* action subtype *Conceptual analysis*, which in our data represented a meta-level analysis of the work activity, these new categories offer a more intricate view of the continuum of the expansive learning process, especially its critical aspects of redefining the object of activity

and modeling a dialectical abstraction, which allows the ascension to its concrete manifestations, namely potential new practices.

Through the studied CL intervention's practical outcomes, our results also have implications for research on distributed leadership in educational settings. Contrary to the traditional and dominant views of distributed leadership (Spillane et al., 2004), which conceptualize it as a sociocultural interaction relationship based on influence between leaders and followers (for a critique, see Raelin, 2016), our CL study suggests an alternative, dialectical path. In the light of our analysis based on 3rd generation CHAT and the theory of expansive learning, leadership presents itself as more of a systemic and thereby inherently distributed developmental concept, associated with collective intentions for reorganizing activities (reflecting the **Initial ideas* actions) involving multiple interconnected activity systems. We conceptualized the studied school organization as a network of interrelated activities, specifically focusing on its instructional and leadership activities. This perspective emphasizes the relationships between activities and the production of tools and models to support their development. In our case, the activity systems and their interactions were fundamentally transformed through the new distributed leadership conception modeled by our CL participants through expansive learning.

In conclusion, our study broadens the understanding of expansive learning and educational leadership by showcasing the creation of distributed leadership practices as a bottom-up, collective learning journey. By integrating new theoretical insights and empirical evidence, we provide an extended framework for future research to further explore and refine the conception of leadership within the context of expansive learning.

Limitations and further research needs

In contrast to previous studies using the Change Laboratory method (Engeström et al., 2013) or its application (Augustsson, 2021; Bal et al., 2018) and employing a framework of expansive learning action subtypes, we did not include an analysis of the so-called non-expansive learning actions. Those kinds of actions were not central for our research problem focused on expansive learning actions and distributed leadership practice development. We have also limited our data for this paper to the six CL sessions, leaving out the implementation of the leadership model at the school and the CL follow-up sessions. This demarcation allowed us to focus on the most relevant data to respond to our research questions, as the model of distributed leadership was formed during these sessions. Furthermore, we have not included an analysis of the emergence and development of transformative agency involved with the expansive learning process or the process of double stimulation as a mechanism of producing transformative agency in the CL intervention. These key elements of CL interventions are left for upcoming studies. Future studies should also more thoroughly chart the potential of CHAT's dialectical lens on concept formation to contribute to the discussion of school leadership, especially distributed leadership. Hopefully, the present study acts as a discussion opener in that direction.

Note

1. The asterisk in the name denotes that, although situated on the same analytical level, *Initial ideas actions are not proposed to form an additional expansive learning action category.

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Appendix. New subtypes of expansive learning actions and a new category within expansive learning, identified in the CL data

(1) An *Analyzing* subtype named *Conceptual analysis* (category A6 in Table 3).
   - Definition: Meta-level analysis – analysis of work activity on a conceptual level and analysis of communication and process.

(2) A *Modeling* subtype named *Planning the components of a model* (category M1 in Table 3).
   - Definition: Planning of concrete sub-parts and components of a yet unidentified model. This is distinct from the original framework's *Sketching the initial idea of a model* (category M2 in Table 3), which already incorporates an idea of a model.

(3) An *Examining the model* subtype named *Testing the model with simulation* (category E1 in Table 3).
   - Definition: Verbally simulating anticipated work activities while imagining the model as a basis of work practice.

(4) A new analytical category within expansive learning, which we decided to call **Initial ideas of how the activity should be organized*, taking place "in between" the *Analyzing* and *Modeling* actions (see Table 3).
   - This category was defined to count for actions which were especially forward-looking and potential-seeking, in contrast to merely *Analyzing* the current activity, but not yet attempts to formulate a coherent, systemic idea of a potential new activity, characteristic of *Modeling* actions (Engeström, 2015). In Davydov's (1990) terminology, the actions categorized as **Initial ideas* . . . were still on an abstract level, but already looking forward toward the concrete potentials.