

Change Laboratory method for facilitating transformative agency and collective professional learning – case from a Finnish elementary school

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Abstract

The aim of our study is to enrich the current understanding of teachers' collective professional learning and development by introducing a method called the Change Laboratory (CL), which is a participatory work development method based on theory of expansive learning. We present and empirically illustrate how the method was employed among a group of 12 teachers and a principal for facilitating transformative agency, and how it contributed to their collective professional learning and the development of new practices in the school. Our interactional video data consists of six CL meetings and a follow-up meeting held in an elementary school which operates as one of the pioneering university-level teacher training, research and development units in Finland. The CL provided the participants with research-assisted space and tools to collectively analyse and redesign their work activities. In a dialectical learning process, the CL first triggered the surfacing of problems and tensions in the school community, then supporting the conceptualisation of problems as stemming from systemic organisational contradictions, and eventually leading to the creation of novel solutions to resolve the contradictions and transform the school's practices. Our analysis illustrates the significance of transformative agency for turning organisational contradictions as drivers for collective professional learning and development, in a bottom-up process of organisational renewal. Our findings also demonstrate the demands that such a collective process of professional learning poses for teachers, requiring continuous efforts and cultural change.

Keywords

Change Laboratory, transformative agency, teacher agency, professional learning and development, expansive learning, curriculum, cultural-historical activity theory (CHAT)

This is a preprint of the following chapter: Anu Kajamaa & Sakari Hyrkkö, Change Laboratory Method for Facilitating Transformative Agency and Collective Professional Learning – Case from a Finnish Elementary School, published in *Methods for Researching Professional Learning and Development: Challenges, Applications and Empirical Illustrations*, edited by Michael Goller, Eva Kyndt, Susanna Paloniemi, and Crina Damşa, 2022, Springer Cham reproduced with permission of Springer Nature Switzerland AG. The final authenticated version is available online at: https://doi.org/10.1007/978-3-031-08518-5_24.

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1 Introduction

In Western societies, professional learning and development have traditionally been viewed as linear processes of problem-solving in which individuals gain increasing mastery of the culturally available professional knowledge and skills (e.g., Wilson & Berne, 1999; Borko, 2004; Opfer & Pedder, 2011). In recent years, emphasis has increasingly been placed on the collective endeavours of teams and organisations to develop their practices (Cordingley, 2015) and the relationship between individual and collective learning, such as in the form of professional learning communities (Van Meeuwen et al., 2020; Admiraal et al., 2021). However, many professional learning and development efforts for teachers still focus on acquiring tried and tested skills and competencies seen as relevant for adapting to changes and reforms, based on an overly simplified conception of the teaching profession (see Winch, Oancea & Orchard, 2015). Unfortunately, this adaptive approach does not pay sufficient attention to historical and contextual factors (Miettinen, 2013), specifically, the cultural-historical development of the schooling system and the wide variety of schools, each constituting a distinct context. It also tends to disregard the mediated, transformative, participatory and situated dimensions of collective professional learning (Lattuca, 2002). To enable practice transformation, it is pivotal for school-based learning environments to promote collective analysis of interaction, contradictions and construction of the context (Engeström, 2009). Therefore, attention should be directed to participatory methods of work development for facilitating expansive transformations in which the community of professionals learns to widen its possibilities for action by redesigning its own activity.

In this chapter, our aim is to enrich the current understanding of teachers' collective professional learning and development by introducing a method called the Change Laboratory (CL) (Engeström et al., 1996; Virkkunen & Newnham, 2013), which aims to support collaborative learning in and transformation of work activities and organisations. Our chapter empirically illustrates this method, documenting a case from an elementary school which engaged in a participatory workplace intervention to transform their local practices. The method is based on the dialectical tradition of cultural historical activity theory (CHAT) and its application, the theory of expansive learning (Engeström, 2015). Dialectical studies typically analyse organisational phenomena, such as systematic relationships, uncover tensions and contradictions, and detect opportunities and mechanisms for change at the multiple levels on which participants arrange their activities (Benson, 1977). In this tradition, the identity of any activity is primarily determined by its object, which includes a collective motive for the activity and emerges when

human needs and the material-cognitive formations of the world meet (Leont'ev, 1978). The CL method treats historically evolved organisational contradictions within and between activity systems as drivers for expansive learning, that is a collective, non-linear learning process without predetermined end results (Engeström, 2015). The CL method provides a set of instruments for resolving the contradictions and reconceptualising the object of the collective activity via dialogue, analysis and innovating new forms of activity. The method follows the idea of equal participation of the employees in the analysis of their own work activity and aims at system-level transformations. (See Virkkunen & Newnham, 2013).

The CL case presented in this chapter was carried out at an elementary school, which is one of the pioneering university-level teacher training, research and development units in Finland with nearly 1,000 students, 250 trainee teachers and 110 staff. At the time of the CL in 2015, a nationwide curriculum reform (which is instigated every 10 years) was in its early implementation phase, and the teacher training schools were expected to act as forerunners in this process, to guide and encourage local implementation efforts in schools across Finland. The transformational 2016 curriculum reform (Finnish National Agency for Education, 2014) was piloted in 2015 at the school in which the CL was conducted. The new curriculum introduced interdisciplinary learning outcomes called “transversal competence”, a Finnish interpretation of the OECD’s 21st century skills framework, along with a requirement for multidisciplinary and collaborative teaching and studying. The reform, a top-down regulatory process, created an acute need for enhanced collaboration among the teachers, necessitating the crossing of the traditional boundaries of the teacher community and individual teachers’ work. For the teachers with a historically developed substantial autonomy over their own instruction and pedagogical choices, this called for locally transforming both their collective and individual practices.

Responding to the demanding educational change requirements and taking initiatives and actions to tackle such challenges calls for teacher agency (Kumpulainen et al., 2018), which is also a particularly useful concept for studying and explaining teachers’ professional learning and development during such transformations (e.g., Goller & Paloniemi, 2017; Brodie, 2021). We therefore draw from a CHAT-based theory and method developed by Haapasaari and colleagues (2016) and Sannino (2015) to analyse expressions of transformative agency in the discourse of the CL participants (12 teachers and a principal) within the sociocultural context of an elementary school. We view transformative agency as breaking away from a historically formed frame of action (Virkkunen, 2006) and collectively taking agentive actions to address and overcome its inherent contradictions (Haapasaari, Engeström & Kerosuo, 2016). We examined the participants’ transformative agency as a discursive, collective, continuous, non-linear and tension-laden process, closely related to its sociomaterial context and practical actions (see also Kajamaa & Kumpulainen, 2019). More precisely, using the framework developed by Haapasaari and colleagues, we traced the types of transformative agency in the participants’ discourse, namely *Resisting*, *Criticising*, *Explicating*, *Envisioning*, *Committing to actions* and *Taking actions*. Further, we paid special attention to the physical interaction and the usage and collective

constructing of artefacts and representations mediating the qualitative transformation of the participants' work activity (also Engeström et al., 2015; Sannino et al., 2016).

Our analysis was guided by the following research questions: What types of expressions of transformative agency can be found in the CL discussions? and How does transformative agency connect to teachers' collective professional learning and development in the CL?

Our analysis makes the case that the CL enabled the participants to articulate and engage with the organisational contradictions, aggravated by the curriculum reform and challenging their current practices, and to analyse and redesign their work activities collectively. Our findings illustrate the explanatory power of transformative agency in the analysis of expansive transformations, opening a new perspective on the little studied interplay between individual and collective learning. Moreover, emphasising collective actions and systemic change, emerging and evolving over time, it takes us beyond the examination of individual experts and their situational actions (Haapasaari et al., 2016), expanding the current understanding of professional learning and development. However, this expansive learning process represents a unique form of collective professional learning, and it was not without tensions.

2 The Change Laboratory method

The Change Laboratory (CL) is a research-assisted workplace intervention method developed in the 1990s at the University of Helsinki (Engeström et al., 1996; Virkkunen & Newnham, 2013), and has thereafter been used and developed further by academics and practitioners globally. CL projects have been conducted in various fields, including health care, social welfare, media, industry, retail, banking and insurance (Virkkunen & Newnham, 2013), and in school contexts (e.g., Engeström et al., 2002; Sannino, 2008; Virkkunen & Tenhunen, 2010; Morselli & Sannino, 2021; Hyrkkö & Kajamaa, 2021; Rainio & Hofmann, 2021).

The CL method draws from cultural-historical activity theory (Vygotsky, 1978; Leont'ev, 1978) and especially from the theory of expansive learning (Engeström, 2015; Engeström & Sannino, 2010). It is a formative intervention method, referring to an emergent, developing and open-ended approach to theoretically guided research (Engeström, 2011). The CL is a research-supported method designed to respond to local needs and to support expansive learning and redesign and development of collective activity. The CL provides a set of instruments for innovating through expansive learning (Engeström, 2015). In this process, the end results of learning are not predetermined by the interventionists but instead the outcomes are designed by the participants as they work out expansive solutions to the developmental contradictions in their activity systems (Virkkunen & Newnham, 2013).

It is also a participatory method highlighting that each participant's voice, knowledge and expertise counts in the collective analysis and development of activity. Ideally, the participants will be drawn from all organisational levels and professional groups, and it is recommended that there not be more than 20 participants. A series of weekly meetings (usually a maximum of 10 sessions) takes place in a room situated at the workplace and equipped with a set of instruments to promote collective learning. At each meeting, participants are appointed to write down ideas on a set of surfaces (i.e., flipcharts) (see Figure 1), and to take notes for a memo. The CL meetings generate rich discursive data (including video data) which the research team can analyse between the meetings, to prepare for subsequent meetings. Typically, one or two follow-up meetings are held some months after the main meetings to gain insights on the implementation of the new ideas and practices. Then, after all the meetings have been held, the data are typically transcribed and further analysed by applying activity-theoretical concepts, such as the notion of transformative agency.

A key activity-theoretical concept behind the CL method is the dialectical principle of learning and development of *ascending from abstract to concrete* (Davydov, 1990). 'Abstract', in this sense, means something (experiences, ideas, disturbances, problems, worries or innovative solutions) that are separated from their historical and systemic context, whereas 'concrete' refers to an understanding of these phenomena as materially contextualised: in their historical and systemic context as part of the activity system (Engeström & Sannino, 2010). This distinction between dialectical abstractness and concreteness is visible in the CL method in the three surfaces, in which the rightmost MIRROR board is used for representing systemically uncontextualised ('abstract') excerpts from the activity, such as video clips of the actual work situations of the CL participants, as well as statistical information (e.g., organisational key figures), stakeholder interviews and case examples (recorded by the researcher/facilitators) that reveal problems in the organisation and enable analysis of the activities in the CL meetings (see Virkkunen & Newnham, 2013).

In a CL, the process of *double stimulation* (Vygotsky, 1978; see also Sannino, 2015) is another grounding concept, employed to promote transformative agency among the participants (see e.g., Sannino et al., 2021; Morselli & Sannino, 2021) with the help of "mirror data" presented on the MIRROR board. Typically, the mirror data are at the centre of the participants' attention during the first CL meeting, to stimulate reflection and discussion, and to reveal conflicts of motives (first stimulus: a consciousness of a problem in need to be solved) in the work community. This includes both the joint explication of an ambiguous situation, and the emergence of a collective will (Sannino, 2015) to influence or change the pressing situation, for example teachers' need for change in a situation in which they wish to provide high quality teaching but feeling that the prevailing school practices and management are making this impossible. As the CL progresses, the researcher can introduce theoretical concepts to the participants on the MODELS, VISIONS board, to support their analysis of the mirror data, widening their understanding of the first

stimulus, and the systemic nature of their activity (representing the dialectically ‘concrete’). The participants may then create auxiliary motives by means of talk or action (second stimulus), such as envisioning alternative ways of doing their work, that provide tentative solutions to cope with the critical situations (see e.g., Sannino, 2015).

A theoretical model typically used to this end in the CL is the dynamic model of the *activity system* (Engeström, 2015). It helps participants conceptualise the structure of their collective activity – consisting of complementary elements that mutually define and require each other: subject, object and community. Originating partly from Vygotsky’s ideas (1978), the interactions between these elements are viewed as being possible only through mediation by culturally and historically formulated signs and tools (subject-object mediation), rules (subject-community-mediation) and a division of labour (community-object-mediation) (Engeström, 2015). Development and learning can thus be described as systemic transformation of the activity, which can take place through analysing and redefining these elements and their relationships, in other words, a process of remediation. Changes in any one element, or in the relationship between elements, also impacts other elements and their relationships. Furthermore, in today’s networked practices and organisations, a minimum of two interacting activity systems is usually considered the unit of an analysis. (Engeström, 2015; Virkkunen & Newnham, 2013).

The MODELS, VISIONS board can also be used for other theoretical and conceptual tools that the researcher-facilitators see necessary and useful, such as *the model of the phases of expansive transformation of an activity* (introduced by Engeström, 2015). The purpose of the theoretical tools, especially the *activity system* model, is to help the participants to understand the systemic nature of their activity, and to provide a historical and systemic contextualisation to the contradictions behind the disturbances and everyday problems of their work, displayed on the MIRROR board.

During the CL, the participants can gradually begin to grasp and analyse a specific *contradiction* (Il’enkov, 1977), or contradictions, in their historically evolved activity system, thus ‘ascending from abstract to concrete’. Although the systemic contradictions are impossible to address “directly”, they are manifested in the participants’ discourse in several ways (Engeström & Sannino, 2011) and can thus be analysed and turned into drivers for change and learning during the CL process. The systemic analysis and understanding of the work activity and its systemic contradictions is pivotal for dialectic learning in a CL. Without this, organisations usually end up creating targeted solutions to only tackle the immediately observable disturbances, in effect sub-optimising individual parts of the activity system. These solutions, which do not address the underlying systemic contradiction(s) behind the disturbances, often fail in the long term (e.g., Engeström, 2011).

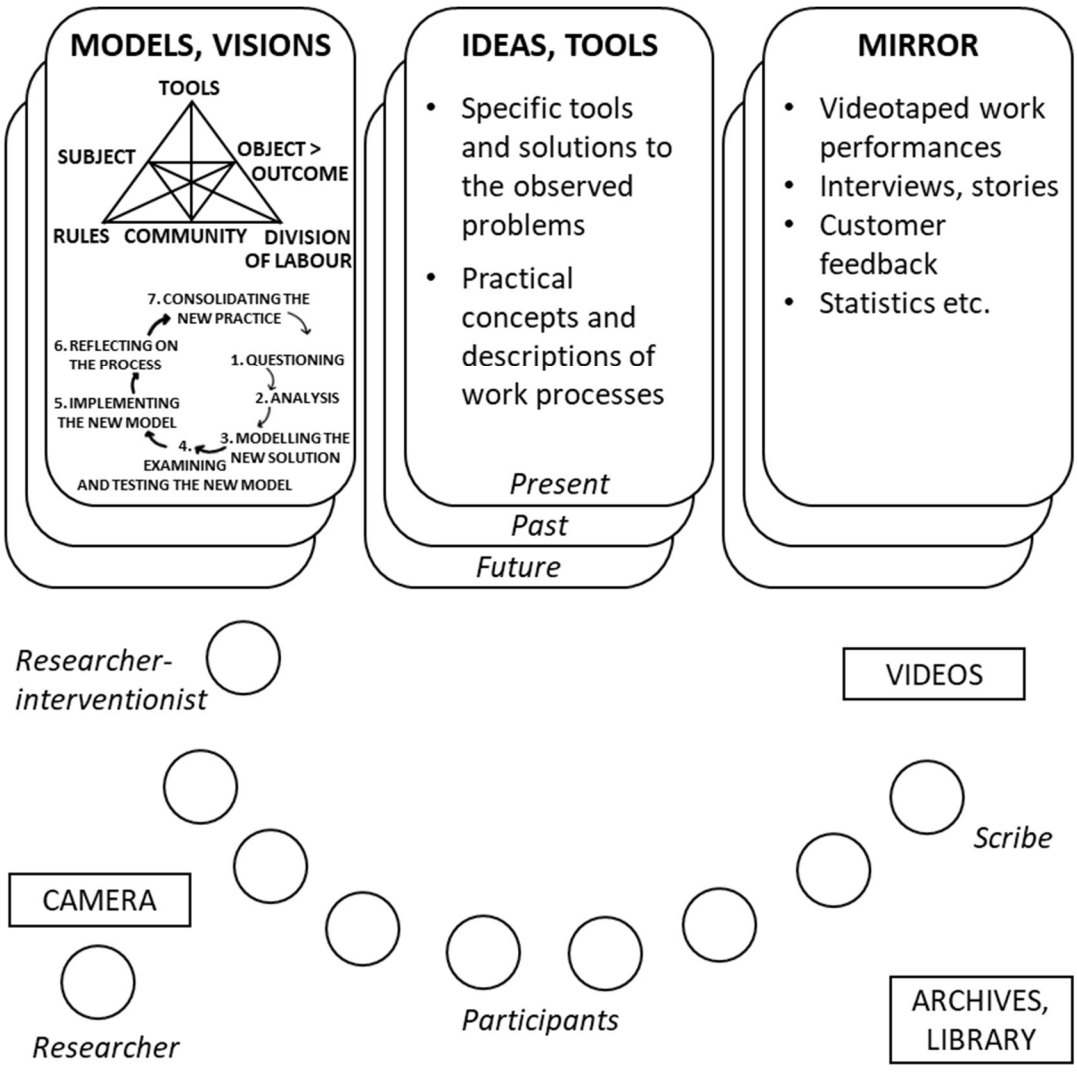


Figure 1. Prototypical layout of Change Laboratory (modified from Engeström et al., 1996, 11; Kerosuo et al., 2010, 118; see also Virkkunen & Newnham, 2013, 16)

During the CL process, collective learning is achieved through talk (e.g., Haapasaari et al., 2016) and experimentation with newly created tools and models for renewed work practices (Engeström, Kerosuo & Kajamaa, 2007). The CL process ideal-typically follows the phases of expansive transformation of an activity (i.e. the cycle of expansive learning) and it thus supports the researcher/facilitator in planning and executing the CL process to follow a series of epistemic learning actions, namely: *questioning* the current work practices, *analysing* tensions and contradictions in the work activity, *modelling* 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. Iterative transitions back and forth between individual actions (micro-cyclicity) are typical for an expansive learning process

(Engeström et al., 2007; Kajamaa, 2011). The expansive learning process fundamentally aims at resolving the underlying systemic contradiction(s) and developing better work practices. Expansive learning is a process of construction and resolution of successive contradictions, which eventually may lead into the qualitative transformation of all the elements of the activity system, eliciting system-level changes in the organisation and qualitative transformation in the object of the activity (Engeström, 2015).

The third surface in the middle is reserved for IDEAS and TOOLS, such as new concepts and forms of activity, collectively created by the practitioners when analysing problematic situations during the CL process. The ideas and tools also function as a second stimulus, providing the practitioners with shared instruments to overcome the contradictions and to transform their circumstances and the work activity. The innovation of new ideas and practices requires moving between the experimental MIRROR and the theoretical MODELS and VISIONS (see Virkkunen & Newnham, 2013).

Expansive learning and transformative agency are theoretically and conceptually closely connected, even inseparable: they both require and enable each other in the sense that “expansive learning within the CL is indeed a process of formation of transformative agency” (Haapasaari et al., 2016, 243). Furthermore, both expansive learning and transformative agency are always connected to a specific contradiction in a specific historically evolved activity system. They enable overcoming the contradiction by introducing new, more adequate mediator(s) (e.g., new cultural tool or practice), to transform the collective activity and its local sociomaterial context. The newly created solutions have, for example, enhanced knowledge sharing, collaboration and understanding of the shared object of the activity system(s) in a novel way (Haapasaari et al., 2016). This process requires time and continuous efforts, as transformative agency “develops and is maintained in collective interaction over time when agentive actions gain their meaning, their consequences and their continuity in the interplay between individuals and their collective” (Engeström, 2007).

3 Conducting a Change Laboratory and analysing CL data

In this section, we describe an empirical case in which the CL method was applied in an elementary school to help a teacher community remediate their activity, riddled with tensions and conflicts, in the wake of a transformational curriculum reform. We also illustrate the analysis of CL data by describing how we executed our analysis in this case.

In early 2015, our team of researchers wanted to study how the school community was experiencing the new curriculum reform. After meeting the principal, we began to interview those interested in sharing their thoughts. The interviewees (a principal, three teachers and a pre-service teacher) described a multiplicity of tensions in the school community, interpreted by us as disturbances of the activity, such as lack of communication, commitment and sense of

community as well as constant haste, aggravated by the upcoming curriculum reform. In the interviews, a need for a collective development effort to tackle these issues also came up. We therefore agreed with the principal and the teachers we interviewed that a series of CL meetings would be carried out at the school, facilitated by our research team. Participation was voluntary, and the weekly meetings would be held on the school's premises.

The videotaped interviews were edited by the research team to be used as mirror data to stimulate discussion and prompt collective analysis of the activity. Mirror data were also gathered by videotaping classroom situations and pre-service supervision meetings for sequences in which the disturbances were visible in everyday work (see Table 1 below for an overview of the mirror data and stimuli used in each meeting).

3.1 The Change Laboratory meetings

Our data comprised six videotaped CL meetings, recorded with two video cameras on opposite sides of the seminar room at the elementary school. The meetings took place once a week in April and May 2015. Each meeting lasted between 93 and 103 minutes, and between six to nine of the 13 participants attended each meeting. The video recordings were transcribed verbatim, resulting in 276 pages of transcription consisting of 4594 speaking turns. In addition to these meetings, a seventh follow-up meeting was held in February 2016, consisting of 745 speaking turns when transcribed verbatim. Table 1 indicates the number of speaking turns and attendees of each meeting, along with a summary of the most central discussion topics and the stimuli used by the research team to facilitate the process. As the table shows, towards the end of the process, especially in the final session, there were significantly more speaking turns than in earlier sessions, implying shorter turns, more overlapping speech and less silence.

	Speaking turns	Attendees	Main discussion topics	Mirror data and stimuli provided by researchers
Meeting 1	575	2 new teachers 6 senior teachers	<ul style="list-style-type: none"> • Introduction to the CL method and theory of expansive learning • Voicing tensions and challenges in the current activity 	<ul style="list-style-type: none"> • Overview of the CL process
Meeting 2	564	1 new teacher 7 senior teachers 1 principal	<ul style="list-style-type: none"> • Instructional leadership • Need for a shared direction and collaboration • Historical development of the organisation and its leadership 	<ul style="list-style-type: none"> • Video clips and summarising slides from meeting 1 • Overview of the CL process

Meeting 3	590	1 new teacher 6 senior teachers 1 principal	<ul style="list-style-type: none"> • Possibility of a shared vision • Ideas for organised collaboration 	<ul style="list-style-type: none"> • Video clips from meeting 2
Meeting 4	592	2 new teachers 4 senior teachers	<ul style="list-style-type: none"> • Historical analysis of the current organisation and activity • Teams as a tool for collaboration • Steering group as a potential new leadership structure 	<ul style="list-style-type: none"> • Video clips from meeting 3 • Historical timeline of the school's development
Meeting 5	782	1 new teacher 7 senior teachers 1 principal	<ul style="list-style-type: none"> • Roles and responsibilities of organisational entities • Reflection of earlier practices • Need for a concrete model 	<ul style="list-style-type: none"> • Video clips from meeting 4
Meeting 6	1491	1 new teacher 5 senior teachers	<ul style="list-style-type: none"> • Incorporating earlier ideas in models • Teamwork and leadership structures, roles and responsibilities 	<ul style="list-style-type: none"> • Summarising slide of earlier discussion points • Prompt to draw models
Follow-up meeting	745	1 new teacher 6 senior teachers 1 principal	<ul style="list-style-type: none"> • Reflection of collaboration and autonomy in daily work • Need to refine the model 	<ul style="list-style-type: none"> • Overview of the six meetings • Phases of expansive transformation of activity

Table 1. Overview of the Change Laboratory meetings, discussion topics and mirror data

Each excerpt presented in the findings section of this chapter features a number indicating the speaking turn in our transcribed data and one of the following codes for the participant making the remark: senior teacher (ST), new teacher, employed at the school for less than a year (NT), principal (PR), researcher (RR) and undefined person (U), replacing their names and accompanied by a running number.

3.2 Data analysis

We analysed the CL participants' discourse and actions on two levels. First, we conducted a detailed analysis of the types of expressions of transformative agency in the teachers' discourse using the analytical framework put forward by Haapasaari and colleagues (2016). Secondly, we analysed the dialectical progress of the participants' collective professional learning and development during the transformation efforts of their collective activity in the CL, relating our

observations to the analysis of transformative agency and the theoretical and conceptual framework on which the CL method is based (see section 2).

For the first level of analysis, we identified expressions of the six types of transformative agency (Haapasaari et al., 2016), namely *Resisting*, *Criticising*, *Explicating*, *Envisioning*, *Committing to actions* and *Taking actions* in the video data and the transcription of the meetings. The number and proportion of occurrences of each type of transformative agency along with definitions and illustrative examples from our data are listed in Table 2 (N.B., the expression of *Taking actions* did not appear in our CL case). The sequences of interaction containing an expression of transformative agency were then analysed. This was not always straightforward as people tend to speak over each other, get interrupted and then continue the thought, forget what they were about to say, hesitate, and so forth. Sometimes the collective creative process obscures the intentions of earlier speakers (Hyrkkö & Kajamaa, 2021), retrospectively altering the meaning of an individual utterance in the overall context. Therefore, assigning a type of transformative agency required constant interpretation of individual utterances in relation to the discussion in general.

In the analysis we relied heavily on the video data, using the transcription mostly as a coding aid. Most often, an expression of transformative agency could be assigned for a single speaking turn. If the same speaker repeated the same idea or thought after another speaking turn (for example, interruption), this repetition would not be regarded as another expression of transformative agency, because the speaker’s intention remained the same. Sometimes, a single speaking turn contained several consecutive, differing expressions of transformative agency. Sometimes, a fast-paced, like-minded dialogue with overlapping speech from several participants was interpreted to contain only one expression – as the intention and meaning were shared. Alongside discourse, we paid special attention to the participants’ physical interaction and their collective construction and use of novel mediating artefacts and representations.

Type of expression	Definition (Haapasaari et al., 2016)	Examples from data
Resisting 24 expressions during the CL (6.8% of all expressions)	Resisting the change, new suggestions or initiatives. Directed at management, co-workers or the interventionists.	<i>We'll soon have more enemies than friends in this work community [---] you are some miracle-makers if you can solve our problems. (Meeting 1)</i>

Criticising 93 expressions (26.4%)	Criticising the current activity and organisation. Change-oriented and aiming at identifying problems in current ways of working.	<i>I think many of us have become... saturated with the constant haste [---] teachers are supposed to be in two places at the same time, so the whole school is based on this systemic fault, the haste is in-built. (Meeting 1)</i>
Explicating 113 expressions (32.1%)	Explicating new possibilities or potentials in the activity. Relating to past positive experiences or former well-tried practices.	<i>You can develop structures in so many ways. In my previous school [---] we had class-based teams [---] they were scheduled [---] and the principal attended all meetings. (Meeting 3)</i>
Envisioning 104 expressions (29.6%)	Envisioning new patterns or models in the activity. Future-oriented suggestions or presentations of a new way of working.	<i>I think we should have a steering group with teacher members [---] and the steering group member then goes to the teams and initiates the development there. (Meeting 5)</i>
Committing to actions 18 expressions (5.1%)	Committing to taking concrete, new actions to change the activity.	<i>People have expressed the need to get more involved, so why don't we try this! (Meeting 5)</i>

Table 2. Types of expressions of transformative agency found in the data.

4 Findings: The Change Laboratory facilitating transformative agency and collective professional learning

In this section, we describe the CL process and present data examples of the expressions of transformative agency, illustrating how transformative agency contributed to the dialectical progress of collective professional learning and development.

Meeting 1 – Resisting and Criticising the current activity

At the start of the first meeting, the researchers introduced the Change Laboratory method and the theory of expansive learning to the participants, describing them as tools for aiding the work community in developing its practices. This prompted two types of responses from the participants: firstly, doubting that the CL could have any effect on the work community, and

secondly, bringing up tensions and disturbances in the work activity. N.B., the principal was not present in the first meeting due to a double booking.

To the researchers' surprise and as a deviation from their planned "script" for the meeting, the teachers quickly began *Criticising* their current activity, articulating the disturbances hampering their work in an analytical manner. Consequently, most of the video excerpts of interviews and classroom situations were not shown as mirror data, and the researchers allowed the conversation to flow freely. During the meeting, the appointed board scribes used the MIRROR board to write three full flip charts of issues under the headline "*Challenges*" and on the IDEAS, TOOLS board only one sentence: "*Could structures be changed?*".

To summarise, the "*Challenges*" listed were 1. Individual interests and differing developmental needs; 2. Lack of leadership in development work; 3. Lack of organisation of work; 4. Lack of instructional leadership; 5. Lack of structures of teamwork; and 6. The "responsibility paradox" (feeling responsible for one's own instruction but being unable to extend the sense of responsibility to the level of community). These aptly worded disturbances and conflicts formed the basis of the analysis of the work activity for the entire CL.

In analysing the problems in the school's practices, the participants interpreted them as stemming from the historically developed strong autonomy of individual teachers (and the organisational practices evolved from it and to support it), and the constantly evolving object of activity in schoolwork as witnessed in the changing curricular demands. The organisation of work based on teacher autonomy was visible in the ambition of individuals to do their work as well as possible but, on the other hand, in the lack of willingness, opportunity or ability to share tasks, resulting in short-lived, individual instructional solutions, metaphorically expressed as "*pedagogical butterflies*" (174, ST6, *Criticising*).

The participants also saw the pressing challenges as stemming from the diverse duties of the university-level teacher training school, contributing to the multiplicity of tasks and uneven workloads, combined with the lack of effective organisational structures for distributing tasks. Behind many of these challenges was a yearning for an educational vision for the school, as first uttered by a senior teacher: ("*We are missing a uniting vision, educational vision, or actually envisioning on any level. This is probably the one major issue causing the incoherence here.*" 218, ST4, *Criticising*). At this point, the establishment of an educational vision was seen as the key task of school leadership. Leadership issues thus became a central topic in the second meeting, with the principal also present.

Dominated by two forms of transformative agency, *Resisting* and *Criticising*, this phase of the CL initiated a shift from individually experienced difficulties toward collective professional learning and development. Already at this early phase of organisational renewal, the teachers began to view the organisational issues as systemic, leading to the realisation of a collective need for change.

Meeting 2 – Elaborating and structuring the challenges: Criticising and Explicating

To employ the conflicts and tensions voiced by the participants in the first meeting as a ‘first stimulus’, the researchers started this meeting by showing video clips from the first meeting, accompanied by a presentation slide with a list of topics, highlighting the disturbances that the participants had identified in their work activity. The presentation slide, acting as mirror data, was visible for the entire meeting, to mediate the conversation.

The first discussion topic on the slide, namely “*Lack and weakness of instructional leadership*”, sparked a conversation, initiated by the principal, problematising the notion of centralised leadership in the school community of autonomous experts. This was a significant step towards conceiving an organisational tension, experienced on an ‘abstract’ level as general lack of direction and structure for work, as a ‘conflict of motives’ stemming from an underlying systemic issue, a historically evolved contradiction in the activity system. It was realised by the participants that only improving a single aspect of the work community (such as introducing stronger leadership) was inadequate for resolving the conflict. Consequently, in the first expression of *Envisioning* at the meeting, the idea of distributing leadership tasks to pairs or teams was brought up as a potential solution by a senior teacher (“*...I guess the school life would develop quicker if [---] instructional leadership would be developed by pairs or teams*” 668, ST5, *Envisioning*).

Towards the end of the meeting, an idea for a new practice was suggested. This took place by drawing from an example of successful collaboration by the pre-service teachers in the school, whose example of improvised collaboration was seen by the principal as a potential model for professional collaboration between subject teachers and class teachers: (“*I’m calling for these small streams of ideas that we have already done [---] they could grow into larger currents, practices for the whole school.*” 888, PR1, *Explicating*). However, this proposal, along with other similar utterances recognising new potential in the activity, still viewed the change as a responsibility of individual teachers and their choices, not something that would require collective efforts and a system-level structural transformation.

In this phase of the CL process, *Criticising* of the current activities continued. However, this phase also captures how the participants further learned to distance themselves from the individually experienced difficulties and jointly began to identify the systemic causes underlying them. Their professional learning thus progressed toward developing a collective ability to *Explicate* the developmental needs of their community.

Meeting 3 – Seeking a shared object through Explicating and Envisioning

In the third meeting, video clips of the previous meeting were shown to stimulate a discussion that took off on the school’s mission statement and the need for a shared educational vision that would permeate all school activity from local curriculum work to teaching and pre-teacher

supervision. The discussion was thus moving toward, or circling around, the shared ‘object of activity’. A first tentative reconceptualisation of the object was reached by binding together the societal, curricular and educational dimensions of schoolwork, and for the first time in the CL bringing “children” into the focus of discussion: (“*ST6 mentioned acknowledging the surrounding society there, so aren’t all the transversal competence goals related to how the child will cope, what skills they get for functioning in the future society?*” 1313, ST3, *Envisioning*).

This was a turning point in the CL: after naming children (or their learning) as the shared object of activity, the organisational problems expressed earlier gained a new developmental focus, functioning as a “motivating force that gives shape and direction to activity” (Engeström, 2008, 89), driving the envisioning of new practices. The teachers expressed a feeling that even such a rudimentary idea of a unifying vision could act as a starting point for a new developmental direction. In other words, instead of relying on individual scripts, the teachers found common ground for an agreement about the school’s vision, or “purpose to exist”. Consequently, the rest of the third meeting was marked by developing practical solutions for enhanced collaboration.

In this phase, the conflicts related to developing work practices identified earlier, were further analysed by the participants and the researchers in light of the shared object. Two types of transformative agency, namely *Explicating* and *Envisioning*, importantly shifted the discussion from mere naming of the school’s various development needs, towards explicating an expanded and shared conceptualisation of the object of the joint activity. We can also witness a redefinition of the ‘subject’ based on the idea of teamwork as the participants bridged their ideas and work actions to the planning of new forms of joint activity.

Meeting 4 – History timeline mediating the development efforts

The fourth meeting focused on the history of the school and how the school’s development over time might help explain the current structures, practices and problems. A picture of a chronological timeline of the school’s key events and transformations, drawn by members of the research team based on teacher interviews conducted between meetings, was used as a stimulus to initiate discussion. While historical analysis had already been carried out even before the introduction of the timeline, making the school’s historical development visible sparked a markedly analytical discussion involving several active participants and characterised by consecutively alternating expressions of *Criticising* and *Explicating*.

Many current organisational structures and practices, previously taken for granted, were identified as incompatible with the needs expressed in the CL. Especially the two new teachers participating mentioned experiences of different kinds of practices from schools they had previously worked at, naming them as potential alternatives to existing ways of working: (“...we had these instructional teams for [---] curricular matters [---] and we also had [---] groups based on school subjects” 1908, NT1, *Explicating*). These experiences from different contexts,

especially concerning teamwork, proved to be a significant source of ideas for the group in developing new structures of teamwork and leadership, such as an instructional steering group as a new administrative structure for distributing leadership duties.

Towards the end of the fourth meeting, elements of a new organisation structure to support collaboration at all levels of the school community – principals, a steering group, teacher teams, and the general teachers’ meeting, and their roles and responsibilities – were envisioned by the participants using the IDEAS, TOOLS board (see Figure 1).

In this phase, establishing a shared understanding of the school’s history enabled the participants to connect new ideas and development plans to this historically evolved “bigger picture” and the political and the societal factors underlying the historical developments. The history timeline was thus an important learning device for developing the participants’ shared understanding of organisational change as a complex, time consuming and continuous process. In this phase, their professional learning and development were characterised by back-and-forth movement between *Criticising* and *Explicating* expressions and between the old and the new forms of activity.

Meeting 5 – Sharing responsibility and envisioning through practical suggestions

As a continuation of the previous meeting, the discussion took off about the tasks, roles and responsibilities of the newly designed teacher teams. As a stimulus, the principal had brought along a list of workgroups currently operating in the school. The list of dozens of workgroups dedicated to various schoolwork and development duties, many of which were non-operational, helped the participants grasp the ineffectiveness of the school’s current teamwork structures, mediating a discussion about the changing professional demands and the inability of the current structures to match them. Our analysis of transformative agency in this meeting shows a gradual shift towards more *Explicating* and *Envisioning*, illustrating the group’s increased ability to view schoolwork as a systemic activity, oriented towards student learning, and to develop specific solutions through recognising the contradictions inherent in the activity. An important mandate for transformation was provided by the principal, who assumed a facilitative role in this meeting, sharing the responsibility for envisioning new organisational practices with the teachers (“*When we meet on August 10th [---] in the planning meeting, how are we going to launch this?*” 2697, *PR1, Committing to actions*).

Towards the end of the meeting, we identified numerous *Envisioning* expressions with active participation from the teachers. In a brief passage of enthusiastic, overlapping speech by multiple teachers, a distribution of duties and responsibilities between teacher teams, teachers’ general meeting and the principal was jointly articulated. At this point, the participating teachers had not only repeatedly expressed transformative agency and empowerment to change their local context but had also assumed a role as teacher leaders who were able to negotiate organisational structures and roles, recorded on the IDEAS, TOOLS board. This phase was particularly important for the emergence and development of the participants’ joint responsibility over

organisational change. From the viewpoint of collective professional learning and development, the dominant types of transformative agency, *Explicating* and *Envisioning*, not only contributed to the responsibility-taking but also promoted the efforts to materialise the organisational change as the teachers jointly made decisions and envisioned practical solutions.

Meeting 6 – Constructing a model to facilitate educational change

Unlike the earlier meetings, for the sixth meeting the researchers did not bring videotaped clips to view and analyse with the participants, but instead used a presentation slide as a stimulus, with topics listed from earlier discussions related to teamwork and shared instructional leadership, visible throughout the meeting. The researchers also encouraged the group to start drawing a model to materialise and summarise ideas articulated during the previous meeting, directing them towards the expansive learning action of *modelling* the new solution.

In innovating new practices and organisational structures during the meeting, the participants relied heavily on external stimuli to mediate the process. These included the presentation slide provided by the researchers as well as the list of work groups provided by the principal in the fifth meeting (through reminiscing), as the newly suggested teamwork practices were mirrored against the long list of work groups and their tasks.

During this meeting, expressions of *Envisioning* were prevalent and were especially identified as the participants engaged in the modelling process. The group drew four preliminary versions of the teamwork and leadership structure on a flipchart before reaching an agreement, ready to draw the fifth and final model. During the process, the preliminary versions of the model acted as ‘second stimuli’ and mediating artefacts, helping the group progressively to create potential new forms of collaboration, enriching the model. The group also tested the model by critically discussing it and by simulating their work activities within the new model through talk.

The model drawn in the CL supported the teachers’ professional learning and development as it materialised the collaborative forms of work by establishing teacher teams with clearly defined roles, tangible tasks and designated responsibilities. Instructional leadership and decision-making over local curriculum work and the school’s duties as a university unit were effectively distributed across the organisation.

Follow-up meeting – Reflection of the implementation

The new teamwork and leadership model was implemented in the autumn semester of 2015 as the school adopted the new curriculum. In a follow-up meeting of the Change Laboratory process, held in February 2016, seven teachers and the principal reflected on their experiences of the implementation of the new model into their daily work. The model had provided a good basis and structure for developing new collaborative practices in the work community, but it had only been taken up by some teacher teams while other teachers chose to hold on to their autonomy

and individual work practices. New ideas for cultivating the model to fit the reality of the daily work better were also initiated and discussed. In the conversation, it became evident that the central contradiction defined in the CL process – teacher autonomy vs. the elevated need for collaboration – aggravated by the new national core curriculum, was still causing disturbances and conflicts in the work community. This shifting between the old and new models of work is typical for an expansive learning process in its implementation phase (Virkkunen & Newnham, 2013; Engeström, 2015). Furthermore, the new curriculum's incompatibility with the school's status as a university research and pre-teacher supervision unit was discussed, marking a shift towards conceptualising the issue as a contradiction between the school's activity system and its neighbouring activity systems, namely those of the university and the governmental education authorities. In conclusion, the transformation of work activity was still an ongoing process, and no final solutions had yet been reached.

5 Discussion and Conclusion

Our chapter contributes to activity-theoretical development efforts which have yielded productive and sustainable solutions to complex challenges in schools, contributing to teachers' professional learning and development (e.g., Zhang et al., 2011; Brevik et al., 2019; Lund & Vestøl, 2020; Junor Clarke & Fournillier, 2012). Our findings also add to the studies which have widened the understanding of the significance of tensions, contradictions (e.g., Engeström et al., 2002; Virkkunen & Tenhunen, 2010; Rainio & Hofmann, 2021) and transformative agency (e.g., Sannino, 2008; Brevik et al., 2019; Kajamaa & Kumpulainen, 2019; Lund & Vestøl, 2020; Grant, 2020; Morselli & Sannino, 2021) in the collective creation of educational innovations and practice changes within schools. Furthermore, our study contributes to the much-needed knowledge and reflection on how the CL method is currently being applied as a tool for professional learning and development in educational settings and what kinds of consequences and results it can yield (Virkkunen & Newnham, 2013).

In this chapter, we aimed to enrich the current understanding of teachers' collective professional learning and development by introducing a participatory work development method called the Change Laboratory (CL). Our findings illustrate how the CL offers a method for facilitating collective professional learning and development through the articulation and resolution of organisational contradictions. This process involves engaging the participants in the articulation of uncontextualised ('abstract') disturbances in their current work practices and gradually moving towards analysing their work as a systemic entity with historically evolved contradictions behind the disturbances – and, eventually, taking actions to create novel practices to resolve the contradictions. This process requires both expansive learning and transformative agency among the participants.

As the CL process unfolded, an especially pressing contradiction identified by the teachers was related to the inadequate tools for reconceptualising the changing object of the joint activity,

specifically, the pupils and their diverse and evolving learning needs, especially in the light of the new core curriculum. The existing instructional and leadership practices had become inadequate in responding to the changed needs. This contradiction was aggravated by the upcoming curriculum reform that laid bare the individually motivated and partly contradictory developmental motives in the school organisation (stemming from the historically formed autonomy of the teachers), which gradually became conceptualised as contradictions related to the subjects, the division of labour and the rules of the teacher community. The transformation, achieved through the establishment of new teamwork and leadership practices, can be interpreted not only as a reconceptualisation of the object but also as a redefinition of the subject, expanding the conception of autonomous teachers with a notion of collaborating teams. The new collaborative process involving the school's local curriculum work, teaching and instructional leadership, oriented towards a new, expanded object of activity, provided an instrument for shifting from individually driven work practices toward more collaborative and shared forms of work and leadership.

Our analysis of the types of expressions of transformative agency in the participants' discourse shows the explanatory power of this framework for facilitating collective professional learning and development in the CL process, leading to practice changes at the level of an entire organisation. Our detailed analysis provides new insights into the mechanisms of how such a transformative development of work practices gradually unfolds in a process of collective professional learning. Although the conversation in the meetings in our case was at times tense and even heated, the critical voices, manifesting as *Resisting* and *Criticising* expressions up until the end of the CL, did not hinder the creation of new solutions and resolution of the contradictions. In other words, the complexity and tensions involved were not harmful but also triggered and maintained collective professional learning (also Kajamaa & Kumpulainen, 2019). On this basis, we wish to highlight the potential of the CL method for offering a safe space for the participants to turn the contradictions into drivers for collective learning and development (Engeström, 2011; Virkkunen & Newnham, 2013; see also Engeström & Sannino, 2011).

Our study also generates new knowledge about the ways the material mediators support participation and create opportunities for shared decision making and responsibility taking, which in our case were also pivotal in enhancing collective professional learning and development. Our case analysis not only describes discursive change efforts, but also elucidates how these are put to use by the creation and enactment of mediators by the actors involved. Furthermore, our findings echo with previous activity-theoretical studies showing that the materialisation of the results of the development projects into shared tools, such as leadership models designed by CL participants, endorses the diffusion and sustainability of the outcomes of organisational change efforts (Engeström et al., 2007; Kajamaa, 2011).

Furthermore, in a follow-up meeting held nine months after the CL process, the group had a chance to reflect on both the CL and the implementation process, revealing that not all the

problems in the work community had been resolved. Despite some significant improvements at the school, the newly implemented collaborative practices had also aggravated yet further contradictions, especially regarding some teachers' professional identities and how they related to the new practices, as well as the school's diverse tasks as a university research and pre-service teacher training unit. To tackle these newly arisen challenges and further facilitate the expansive learning process, another follow-up meeting might prove useful.

To conclude, the Change Laboratory method can provide a powerful tool for collective professional learning and development in educational settings, by facilitating the participants' transformative agency and expansive learning. The method requires volition from the participating organisational actors to actively engage in the critical analysis and development of their daily work activity (Virkkunen & Newnham, 2013). Along with the previous literature, we wish to highlight the role of the facilitator as pivotal, not in directing or predefining, but acting as a chair of the discussion, asking reflective questions and offering tools to aid the participants to reflect and analyse their work activity, and to transform their circumstances in a way meaningful to them, their students / clients and the society. For the facilitator, conducting such a process requires research knowledge and deep understanding of the principles of the method. In addition, the method calls for creativity, flexibility (e.g., accepting deviations from original plans to adjust them to the developmental stage of the given context) and sensitivity toward the participants' multiple voices, opinions, ideas and emotions. Thus, each CL process is unique, and as it happens as intertwined to the actual work practices, it potentially produces sustainable new activity models and other consequences. In our experience, it is crucial that the facilitator maintains trust and resilience throughout the process. Echoing Engeström and colleagues (2007), we emphasise the importance of acknowledging that the collective identification and analysis of contradictions, to generate collective sense, meaning and expansive learning, is a time consuming and demanding collaborative journey which may take months and even years.

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