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Ruth Jensen Kirsten Foshaug Vennebo

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Ruth Jensen and Kirsten Foshaug Vennebo
Department of Teacher Education and School Research, University of Oslo, Oslo, Norway

Abstract

Purpose – This paper aims to address workplace learning in terms of investigating school leadership development in an inter-professional team (the team) in which principals, administrators and researchers work together on a local school improvement project. The purpose is to provide an enriched understanding of how school leadership development evolves in a team during two years as the team works on different problem-spaces and the implications for leadership in schools.

Design/methodology/approach – The paper is based on a larger study with a qualitative research design with longitudinal, interventional, interactional and multiple-time level approaches. Empirically, the paper draws on tools, video and audio data from the teams' work. By using cultural–historical activity theory (CHAT), school leadership development is examined as an object-oriented and tool-mediated activity. CHAT allows analyses of activities across timescales and workplaces. It examines leadership development by tracing objects in tool-mediated work and the ways in which they evolved. The object refers to what motivates and directs activity.

Findings – The findings suggest that the objects evolved both within and across episodes and the two-year trajectory of the team. Longitudinal trajectories of tools, schools and universities seem to intersect with episodes of leadership development. Some episodes seem to be conducive for changes in the principals' schools during the collaboration.

Research limitations/implications – There is a need for a broader study that includes more cases in other contexts, thus expanding the existing knowledge.

Originality/value – By switching lenses of zooming, it has been possible to examine leadership development in a way that is not possible through surveys and interviews.

Keywords Workplace learning, Cultural-historical activity theory, Interaction analysis, Multiple-time analysis, School leadership development

Paper type Research paper

Introduction

The focus of the research reported in the present article is *school leadership development*. There is a large body of research on the preparation of aspiring school leaders and the development of school leaders (Bush and Jackson, 2002; Lumby *et al.*, 2008; Hallinger, 2003; Huber, 2004; Young *et al.*, 2009). Many of the studies are generated from interviews and surveys of individuals. This body of research provides robust knowledge regarding what type of leadership development is offered and how school leaders perceive the programs and their opportunities to learn; however, some aspects require further attention (Jensen, 2014). One aspect that lacks attention is the fact that leadership development is taking place not only in homogenous settings within workplaces but also across workplaces where professionals representing different workplaces interact

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with each other, which was the case with the team under study. The extent to which these workplaces are made relevant and impact the collaborative work is an empirical question. Another aspect that lacks attention is that leadership development implies interactions with different tools, such as cases, books, PowerPoints and problem-based learning. Therefore, there may be a need to spatially include the tools in the analysis unit to make sense of the data in addition to including the participants. The tools may have their own trajectories because they are developed over time. A third aspect that lacks attention is the fact that leadership development is not a one-time project but rather a continuous project that requires scrutiny of the evolving processes over the programs based on longitudinal data. A fourth aspect that lacks attention is that leadership development may imply work on several problem-spaces. As such, there is a need for tracing objects within shorter units of time, such as moments and/or episodes.

The present study seeks to approach the mentioned limitations by examining how leadership development evolves within a team comprising members from different workplaces by zooming in on object-oriented and tool-mediated work within episodes and the two-year team trajectory as well as across the two timescales to achieve a nuanced picture. In other words, the study aims to reveal the ways in which *school leadership development evolves in a team by empirically showing the evolvement and theorizing about it from different zooming levels.* The following research questions have guided the analysis:

RQ1. What characterizes the evolvement of the project object worked on by the team within the two-year trajectory of the team?

RQ2. What characterizes the evolvement of situational objects worked on by the team within episodes?

RQ3. What characterizes the evolvement of situational objects worked on by the team within episodes in the context of the two-year trajectory of the team?

Research within the field of school leadership development involving different levels of zooming based on interactional data is sparse. Although cultural-historical activity theory (CHAT) has been used to study temporal and spatial aspects of development, it has not been used in research on school leadership development to empirically analyze these aspects.

Empirically, we report on a project undertaken in Norway in which principals, professionals from a local educational setting (administrators) and researchers from a university collaborated as a team in a two-year school improvement project. The team comprised two primary school principals, one lower secondary school principal, an administrator from the schools' local municipal educational authority and two researchers from a university. The team was formed to support the principals of the participating schools in the project in leading professional and organizational learning within their schools. Thus, the team was viewed as an arena for leadership development. The local project aimed at increasing the students' expertise to approach factual texts[1] in different subjects with learning strategies. The team met in ten workshops during the two-year project period to analyze different problem areas in the schools related to leading the local project. Several tools, such as video clips from classroom practice, field notes from observations, structures for analysis of problem-spaces and evaluation reports, were introduced to the team (mostly by the researchers) to trigger the processes

of learning within the team. This research project affords an opportunity to examine important aspects of school leadership development that are missing in the existing literature, to generate enriched insights that can be used by those designing and investing in leadership programs and to provide knowledge about the potential of switching zooming levels when researching leadership development.

We used CHAT (Engeström, 1987) as a theoretical framework for the analysis. Third-generation CHAT is grounded in Vygotsky's (1986, 1978) work on object- and tool-mediated actions (first generation), Leont'ev's (1978, 1981) work on object- and tool-mediated collective activity (second generation) and Engeström's (1987) work on expansive learning (third generation). The third generation of CHAT is often used as a departure point for research on workplace learning in spaces in which at least two activity systems intersect (Engeström and Sannino, 2010), which was the case with the team under study. The term "activity system" will be explained in the theory chapter.

The article is structured as follows. First, we provide a brief review of how researchers approach different units of time. Second, we present the analytic framework of the present study. Third, we present the study and its methodology. Fourth, the analysis is presented, followed by the discussion and the conclusion.

Previous research on temporal and spatial aspects of development

Examining how leadership development evolves includes both spatial and temporal issues. Spatial and temporal aspects of learning are often overlooked in cognitive theories of learning, while researchers within a socio-cultural tradition account for these aspects in different ways (Ludvigsen *et al.*, 2011). Thus, this section presents selected studies dealing with issues of temporality and spatiality from the socio-cultural tradition.

There are ranges of natural timescales. Lemke (2000), for example, listed a range of typical timescales within education, such as a semester, a school day and a lesson. In traditional leadership development at a university, there may be recurring temporal patterns, such as semesters, seminar days and sessions. The length of a semester, a seminar day, a lesson, etc., has developed over time and becomes known to those engaged in the courses. In new activities, such as the team being studied, there may be no such pre-structured temporal patterns. Whether the team under study developed its own temporal pattern over two years of collaboration is an empirical question.

Researchers have considered the question of how timescales are interrelated, suggesting that there is always a higher level of a timescale that constitutes developmental processes in lower-level timescales. Lemke (2000, 2001) argued that understanding activity at a certain level requires examination of the levels above and below that level, as changes in one timescale may produce changes on a lower level. Roth (2001) showed how longitudinal trajectories of a class, math and the teacher are intersecting moments of classroom practices. In addition, temporality also examines how shorter units of time may produce changes in longitudinal timescales and vice versa (Lemke, 2000). For instance, Engeström (1999a) showed how specific learning actions in boundary zones, in where different activity systems intersect, generated longitudinal changes in interacting working contexts when actors from different working contexts work on shared objects. Typical ideal learning actions in boundary work can include "questioning" the existing practice; carrying out "historical and empirical analyses" of the past, present and future of the situation, "modeling" the new

solution; "examining the new model"; "implementing the new model" and "reflecting on the process"; and "consolidating the new practice". Together, these actions form what he calls "expansive cycles" of learning (Engeström, 1999a, p. 33) that may create changes in the interacting working contexts as a result of the collaboration. The processes may be never ending stories. Expansive cycles may take years, but they may also occur as "miniature circles of innovative learning" within short collaborations (Engeström, 1999b, p. 385).

Rather than studying developmental work from one timescale, researchers may switch between timescales. Roth (2001) showed how it could be possible to switch between different levels of zooming, i.e. between utterances of individuals, a group of students or a whole class. In this way, he adopted what he called "a dynamic unit of analysis". He empirically showed how individual trajectories, the trajectory of a classroom community and the trajectory of the situated activity intersect in moments of practice.

The tools may have their own trajectories developed over time. Tools may temporally link long-term processes and short-time events (Lemke, 2000; Ludvigsen *et al.*, 2011). Ludvigsen *et al.* (2011) showed how different artifacts intersected during students' problem solving and how the students' creation of common objects brought different timescales together. Including artifacts in the unit of analysis means spatially widening the unit of analysis.

The referenced studies demonstrate how developmental work is constituted by temporal issues, i.e. how longitudinal timescales are producing changes in shorter timescales and vice versa and how trajectories of artifacts may intersect with moments of practice. What the aforementioned studies lack, except for the studies by Engeström (1987) and Ludvigsen *et al.* (2011), is attention to objects, which is regarded as the cornerstone of CHAT (Kaptelinin and Miettinen, 2005).

Analytic framework

CHAT offers an explicit set of analytic concepts for studying organizational phenomena as emerging constituents of object-oriented activity, giving virtue to the understanding of the complex relations involved in their origin. Hence, a CHAT approach provides an opportunity to study in-depth how evolving leadership development is constituted in the interplay of individuals, purposes, and tools to the affordances and constraints of the context (Vennebo, 2015).

In CHAT, time and space are built into the analytic concepts through a focus on tools and objects (Ludvigsen *et al.*, 2011). We will argue that time and space are also built into the analytic focus through CHAT's focus on *activity systems*. In the present study, schools, municipalities and universities are considered to be different activity systems because they are directed and motivated toward different *historical objects* (Engeström, 1987), which have their own origins and development trajectories usually developed over a long period. In general, as activity systems, schools are directed toward and motivated by teaching students to become competent citizens in the future, while municipalities are directed and motivated toward implementing national reforms and accounting for the results of implementation and other factors. Generating robust research and research-based teaching is the historical object of universities.

Objects distinguish one activity system from another (Engeström, 1987) and direct and energize activity (Foot, 2002). When studying object-orientation, it is possible to

study what people are doing as well as why they are doing it by studying what motivates an activity (Edwards, 2010; Kaptelinin, 2005; Nardi, 2005). Rather than taking each activity system, such as schools, municipalities and universities, as the departure point for analysis, third-generation CHAT focuses on object-oriented and tool-mediated work, which in the present study is called *boundary work*, as the work is situated in a team across schools, an educational administration and a university as interacting activity systems. In new settings, such as the team, the object of the boundary work may be blurred and ill-defined in the beginning of the collaboration and thus must be negotiated among the actors (Jensen and Lund, 2014).

Historical objects are usually developed over decades (Engeström, 1999a). The team only existed for two years and is thus not conceptualized as an activity system in itself. In such cases, intermediate concepts may be needed (Engeström, 2008). The concept, boundary work, refers to the object- and tool-mediated work taking place within the team composed of participants from different activity systems. What directed and motivated the boundary work during the two-year project is conceptualized as the *project object* (Hyysalo, 2005).

As mentioned, the team under study analyzed different problem-spaces in the local project. Engeström (1999b) conceptualized such phenomena as situation-specific problems. In line with Jahreie and Ottesen (2010), we use the term *situational constructed objects* to conceptualize work on different problem-spaces *in situ*. Situational objects give direction to the interactions in present situations within episodes. For example, the team examined how to cope with teachers who did not want to be observed and the implications for leadership as one situational object before discussing how to understand the arguments of teachers in a staff meeting as another situational object.

The different types of objects that we are referring to in the analysis (historical objects, project objects and situational objects) are carriers of different units of time. Historical objects refer to developmental work within activity systems over decades, project objects refer to development over short periods and situational objects refer to development within episodes. Historical objects constitute, project object, which constitute situational objects.

In CHAT, tools are seen "as an integral and inseparable component of human functioning" (Engeström, 1999a, p. 29). The term "tools" refers to what Vygotsky (1978) called physiological tools and psychological tools. While physiological tools are used to master thinking and communication, for example, physiological tools are used to change activity. Humans use tools when working on different objects. Whether specific tools are made relevant in the collaborative work in the team is also regarded to be an empirical question. Lists of tools are presented in Appendix.

In CHAT, development refers specifically to the broadening of objects that motivates and gives meaning to a collective activity (Engeström, 1999a). Thus, to enrich our knowledge of how leadership development evolves in the team, it is necessary to pay close attention to how the broadening of objects occurred as a spatial aspect of leadership development.

Several approaches have been chosen to examine how leadership development evolved in the team under investigation. The next section presents the different methodological approaches used in the study with a specific focus on the research questions mentioned above.

The methodology of the study

The present study is built on a larger study (Jensen, 2014). The larger study is designed as *a longitudinal* so-called *panel study* (Bryman, 2012; Cohen *et al.*, 2008) because it sought to examine how leadership evolves in a particular team consisting of the same people over two years. The larger study partly consisted of ethnographic documentation in the form of 25 h of audio and video recordings from the ten workshops of the team. Video and audio data constitute ethnographic data, a documentation of what happens *in situ* (Heath and Hindmarsh, 2002), which provides us with an opportunity to take an analytic approach beyond observation and field notes. The present article uses the entire data set to answer the research questions.

The larger study used both *analytic* and *developmental approaches*. The analytic framework was derived from third-generation CHAT (Engeström, 1987). As mentioned, the developmental approach aimed to contribute to school leadership development by triggering learning processes in the team through the help of different physical tools. Thus, physiological tools are included in the data corpus along with 25 h of audio and video data. Consequently, the study has an *interactional approach.* The study also has an *intervention approach* because the researchers participated in the team and introduced several tools themselves.

A researcher's involvement in the unit being researched may challenge the analytic perspectives of the research. Various strategies have been used to produce a valid data analysis, despite the fact that one of the authors was a full member of the team being researched. For example, during the research process, the author shifted from an interventionist approach to the field to an analyst approach. The time lag between the collection of data and the analysis of data represented another strategy. The third strategy was to record the interactions using video and audio recorders. The fourth strategy was to transcribe the discursive actions in the team, and the fifth strategy was to code the discursive actions. The sixth strategy was to apply a comprehensive conceptual framework. Finally, the sub-studies were discussed with national and international colleagues, and the articles were subjected to review processes in international publications.

As mentioned, several artifacts, such as video clips, field notes from classrooms and PowerPoints, were introduced to the team (Appendix 1). These artifacts were collected as sources of data, making it possible to trace the interactions with tools and then return to the artifacts to better understand what the team members were discussing. The artifacts and audio and video recordings made it possible to analyze the interactions among team members as well as the interactions with the tools.

The data corpus was previously organized into action-relevant episodes (Barab and Kirshner, 2001), which also constitute the unit of analysis in the present study. An episode shows what project boundary work is directed toward *in situ*. A new episode is delimited by a start or a thematic shift pertaining to the situational object.

The level of analysis in this article includes both the episodes and the trajectory of the team evolving over the two-year duration of the project. In this sense, the present study is a *multiple-time study*, as it deals with both long and short timescales (cf. Lemke, 2000, 2001). When examining and theorizing what characterizes the evolvement of objects within the two-year trajectory of the team (*RQ1*), we traced the evolvement of the project object within the two-year trajectory of the team by analyzing what was being worked on *in situ* from the transcripts on an overall level. We have reviewed the transcripts for

any changes in what was being worked on. When examining what characterizes the evolvement within episodes (*RQ2*), we traced the evolvement of situational objects within each of the 34 episodes.

When examining what characterizes the evolvement objects within episodes in the context of the trajectory of the team (*RQ3*), we traced whether any episodes seemed to be conducive to changes in the way in which the principals approached leadership issues in their schools by tracing whether the work in the episodes was picked up in later episodes in ways that reflected the new practice.

In sum, the overall study was designed with a longitudinal, ethnographic, interactional and multiple-time approach. The multiple-time approach has guided the analysis of the data for the present article in particular.

The team being researched consisted of Eileen (A)[2], a leader from the educational administration in the municipality; Sara (A) and Peter (A), who held the same position; Tony (P), a principal from a lower secondary school; Annie (P), a principal from a small primary school; Billy (P), a principal from a medium-sized primary school; and the researchers, Casper (R) and Rachel (R), from the university. All of the participants have experience as teachers and leaders. Most participants also have formal education in educational leadership.

The aim of the next section is to empirically demonstrate and theorize how leadership evolves in a team by tracing objects within and across timescales and settings within the context of CHAT.

How leadership development evolves over two years

First, this section empirically shows and theorizes what characterizes the evolvement of objects within the two-year trajectory of the team and then focuses on what characterizes the evolvement of objects within episodes. Finally, this section theorizes what characterizes the evolvement of objects within episodes in the context of the team's trajectory.

What characterizes the evolvement of objects within the two-year trajectory of the team?

In the search for what characterizes the evolvement of objects within the two-year trajectory of the team, we widened our scope spatially to focus on the team's work on the project object over two years. By tracing the project object, it became apparent that the project object was ill-defined in the two first workshops (Jensen and Lund, 2014). The team struggled to identify the purpose of the collaboration as well as how to collaborate; however, after many ideas were discussed and the needs of the participants were made explicit, the interaction data showed that a project object emerged. Further analysis showed that in Episode 4, the team began to focus on *leading teachers in the local project.* The team analyzed the practices collectively, and questions were raised about the implications for leadership. While the team continued to analyze the challenges in teacher and leadership practices, in Episode 16, the team began to discuss *the goals of the local project and how to reach them*. In Episode 17, the team also discussed *different perspectives of teachers' practices*, such as processes of change, leadership and learning – the culture of feedback and implementation. *Evaluation (of the local project) and looking ahead* was the focus of Episode 22. Figure 1 shows how the

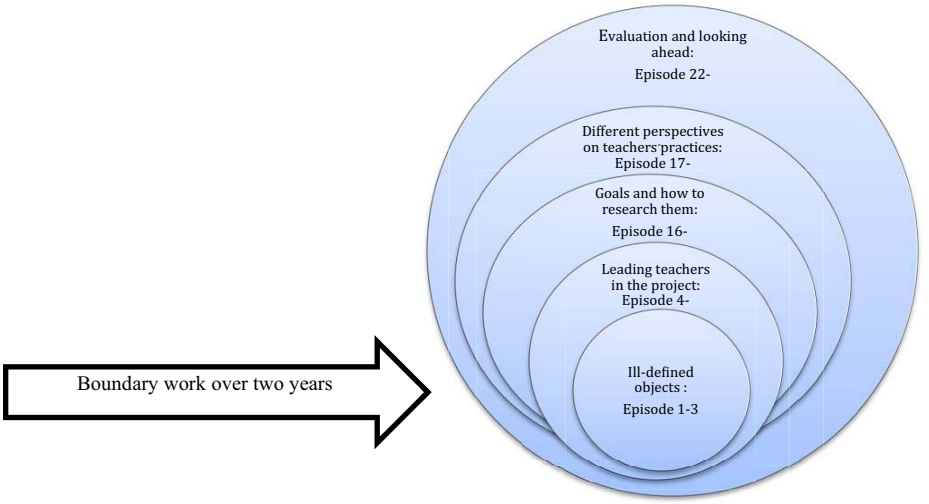


Figure 1.
The evolvement of the project object of the boundary work over two years

project object expanded, spatially and became more complex during the two years as new layers were incrementally added to the object.

In other words, by zooming out to analyze the two-year trajectory of the team's work on the project object, it became apparent that a project object gradually emerged after the team struggled to identify the project object of the first two workshops.

In further examinations of *what characterizes the evolvement of objects within episodes*, we zoomed in on the 34 episodes to examine and theorize what characterized the evolvement of objects within each episode. We selected Episode 22, which is situated in the fourth layer that was added to the project object (see Figure 1), to exemplify typical aspects of the evolvement.

What characterizes the evolvement of objects within episodes?

Excerpt 1 presents three turns in the dialogue. We met with the team, and they commented on PowerPoint slides about evaluation that were presented by the researchers as an introduction to the issue of evaluation in the local project.

Excerpt 1

In Excerpt 1, we can see how Tony (1) argued that evaluation is double-sided. He adopted the perspective of the Norwegian educational authority and contrasted it by showing what the authority perspective looks like from a school's perspective. He made his school's perspective explicit by referring to his experiences when arguing that the needs are different (Table I):

> It is the national authority's need to measure and control and the need to evaluate and improve the inner processes in different workplaces […]. We [the schools] are beginning to call for silence to dig into what we already have in order to create a calmer situation […].

Tony indicated that there are contradictions between the historical objects of the national educational authority and the schools' historical object. He also indicated that

Utterance #	Who	Utterance
1.	Tony (P)	I think there is a duality in all kinds of evaluation. It is the national authority's need to measure and control and the need to evaluate and improve the inner processes in different workplaces … [3] We [the schools][4] are beginning to call for silence to dig into what we already have to create a calmer situation … I do understand the need for getting to know the situations in schools in external types of evaluation, but this is a sort of external demand that is not so important to us
2.	Rachael (R)	And then the question is what to use it [the evaluation] for? Some [the researchers] conceptualize it as various forms of accountability … The question is, how is it possible to assess local projects and produce valid and reliable results, which might be very demanding?
3.	Eileen (A)	… We can see it locally in areas being prioritized by the local authority in the municipality …

Table I.
Excerpt 1

national authority is concerned with making the lower level (the schools) accountable for results, while his school is concerned with establishing a calmer situation.

Rachael (2), the researcher, argued from a research perspective: "*some [the researchers] conceptualize it as various forms of accountability* …". By using the term *accountability*, she elaborated on Tony's (1) statement and expanded upon and theorized the situation. In this way, the historical objects of university related theorizations are made relevant by the researcher. Eileen (3), the administrator, made the perspective of the local authority explicit and argued that local priorities reflect national priorities, possibly indicating that local authorities are trying to implement national priorities.

Excerpt 1 shows typical interactions of the team. The participants built and extended each other's statements and included different perspectives when discussing evaluation as a situational object. They used the perspectives of other activity systems and made the perspectives of their own activity systems explicit when working on an evaluation as a *situational object.*

During discussion, the participants, who are familiar with different activity systems, used different tools. Tony (1) and Eileen (3) drew upon experiences from their own practices, while Rachael (2) drew upon theories.

The way in which the team worked on evaluation as a situational object in Excerpt 1 is typical of the team's work on other situational objects. By zooming in on what characterizes the evolvement of objects within episodes, the findings suggest that the evolvement of objects within episodes could be characterized as perspective-making and perspective-taking, as the historical objects of different activity systems are made relevant when working collectively on situational objects and as a use of different tools in the discussion. The discussion illustrates that the different historical objects may result in tension when they intersect.

The next section explores the layer "evaluation and looking ahead", which was added to the project object (see Figure 1) to reveal what characterized the evolvement of objects within episodes in the context of the team's trajectory. It is shown how Episode 29 becomes conducive to a new approach to evaluation in two of

the pilot schools. We selected Episodes 29, 31 and 33 to show the typical ways in which existing evaluation practices are questioned, analyzed and assessed across episodes.

What characterizes the evolvement of objects within episodes in the context of the team's trajectory?

After 18 months, the educational administration of the municipality reported their progress during the first phase of the local project to the national board of the program. Different types of self-reported data about the students' strategies were gathered from the three schools for this report. The report was a written text. Students' statements constituted one chapter in the report. Eileen (A) introduced the report to the team, and the researchers (R) used the texts as a physical tool and departure point for exploration for the team. In Excerpt 2, which was taken from Episode 29, the team began to discuss the way in which the data from the students were gathered and presented for the mid-way report.

Excerpt 2

We can see how the researchers, Rachael (1) and Casper (2), viewed the mid-way report in the context of the principles of research. Casper (1) drew attention to the need to make the premises of the analysis explicit, while Rachael (2) drew attention to the relationship between the data and knowledge that could be generated from the students' statements. Here, the researchers are *questioning existing practices* and "teaching" a methodology to the team members based on the mid-way report as a tool. Eileen (4) conceptualized the report as "semi-academic", which may indicate that she was devaluing the report or admitting that producing scientific reports is beyond the expertise of the administrators. Billy (4), one of the principals, began to search for what was "wrong" with how the data were gathered. He wondered if that issue was related to the way in which the questions were raised (Table II).

The team also began to discuss what they knew about the process for implementing the goals of the application and where their knowledge fell short. In Excerpt 3, we examine Episode 31. In this episode, the researchers challenged the participants to find more valid and reliable ways to collect data.

Utterance #	Who	Utterance
1.	Casper (R)	. . . It is very interesting to read the statements [of the students in the report] . . . It could be a small section or a few lines about how it [the analysis of the data] has been done
2.	Rachael (R)	The approach [the way the data have been collected] offers information about what they [the students] **say** they are doing, rather than what they are doing
3.	Eileen (A)	It has been a scientific challenge all the way . . . This is a more semi-academic way of collecting data
4.	Billy (P)	Right, it concerns how the questions are raised [in the report]

Table II.
Excerpt 2

Excerpt 3

When Casper, the researcher (1), challenged the participants to gather new data, the principals and administrators did not seem to resist, even though collecting new data takes time. Instead, Tony (2) re-analyzed the situation by referring to past experiences and drawing attention to reliability and validity. The team was in the process of identifying more reliable and valid ways to collect data to evaluate the first phase of the local project. Tony (4) suggested collecting data from students to determine whether they used strategies, while Eileen (5) suggested asking in another way. The team is in the process of *modeling a new practice* (Table III).

Between Workshop 8 and Workshop 9, the principals from the two primary schools arranged situations in which the teachers could observe how students in different grades approached unknown texts. In other words, the schools *tried out a new practice*.

Because the team worked with several problem-spaces other than evaluation in Episode 32, we will next examine Episode 33 in which the team worked on evaluation again for Excerpt 4. In this episode, Annie shared the result of a new evaluation at her school with the team. In Excerpt 4, the team began to discuss the disparity between how the students were categorized prior to the observation and how the teachers assessed the students' competencies when they approached unknown texts.

Excerpt 4

As shown in Excerpt 4, the team began to discuss and evaluate the unexpected results of two of the students. Casper (2, 4), the researcher, asked questions about the logic of the categorization and the results of the observation. The team was in the process of *evaluating a new evaluation practice* (Table IV).

In summary, by zooming in on leadership development with episodes, which serve as short units of time, and zooming out to the two-year trajectory of the team to trace how the issue of evaluation was followed up on in later episodes, it became apparent that existing practices were questioned, analyzed and modeled in Excerpts 2 and 3. In Excerpt 4, the new practice was shared with the team and evaluated. As we do not have data about the new practice's implementation in schools, it might be more accurate to argue that the findings suggest that one episode is conducive to the new evaluation practice.

Utterance #	Who	Utterance
1.	Casper (R)	. . . How can you ensure the quality of your views without drowning in data?
2.	Tony (P)	. . . This is very difficult . . . It can be completely different things that might be the reason why we have improved; it might have been worse . . .
3.	Casper (R)	. . . If we look at some of these goals [in the application] that we have talked about for years . . ., which one might be particularly interesting to get feedback on from both students and teachers?
4.	Tony (P)	The students are interesting, I think . . . It is as if students, unless we force them to do so, begin to use learning strategies and are dealing with it in a way they have not before . . .
5.	Eileen (A)	. . . Then we might ask in a different way . . ., what strategies do you not prefer and why?

Table III.
Excerpt 3

Utterance #	Who	Utterance
1.	Annie (P)	What I can see [from a table made by the teachers] is that there are differences between the grades. Grade 4 had a weaker result than expected . . .
2.	Casper (R)	Could I ask: does student 4 have higher qualifications than student 1[referred to in the table]?
3.	Annie (P)	Basically, yes
4.	Casper (R)	Basically, yes. But you said that the student did not remember the text. How do you perceive the relationship between being categorized as a successful student [and the observation of how the students used strategies when being observed]?

Table IV. Excerpt 4

In the next section, the findings are discussed in the context of previous research on workplace learning, inter-professional work and boundary-crossing.

Discussion and conclusion

This article aimed to reveal the ways in which *school leadership development evolves in a team by empirically showing the evolvement and theorizing about it from different zooming levels*. The study examined what characterized the evolvement of objects within the two-year trajectory of the team, within episodes and across episodes and the trajectory of the team.

After studying what characterizes the evolvement of objects within the trajectory of the team, the findings suggest that the team underwent incremental changes. This finding stands out from the findings of many CHAT studies, which report major changes when activity systems interact (cf. Engeström and Sannino, 2010). Still, it may be valid to argue that incremental changes might be important in the context of workplace learning. In the present study, two schools tried a new evaluation practice and documented its implementation in accordance with its goal to obtain funding. The implication of this result is that also incremental changes needs the providers' of leadership development as well as researchers' attentions.

After having examined what characterized the evolvement of objects within episodes, the findings suggest that the evolvement of objects within episodes could be characterized as perspective-making and perspective-taking. When Akkerman and Bakker (2011) discussed these phenomena, they referred to Boland and Tenkasi (1995), who explored perspective-making and perspective-taking from an individual perspective. In contrast, the present study focused on perspective-making and perspective-taking in social interactions. When these phenomena characterize social interactions in boundary work, one may argue that the boundary work has become "multi-voiced" because the participants are crossing the boundaries of activity systems when collaborating (Engeström, 2003). Multi-voiced work means that participants do not need to have expertise in the same domains of knowledge – in fact, different competences can be advantageous. The implication for leadership development is that heterogeneous settings might be beneficial rather than disadvantage.

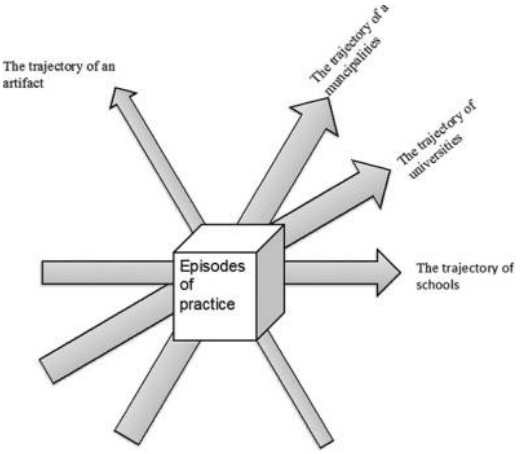
The findings suggest that the participants used different tools when collaborating. The researchers in the team referred to theories and research, while the principals did not. One explanation may be that theory and research do not act as tools in principals'

work. A second explanation may be that the principals did not have the opportunity to prepare for using theories and research in advance when exploring situations with the team, and the researchers who were in charge of leading the workshops did. A third explanation may be that a distribution of labor gradually emerged in the team in which the administrators and principals contributed with experiences from their contexts, while the researchers contributed with theory and research. The implication of this finding may be that there is potential for clarifying the roles and the selection of tools in the beginning of collaborations similar to this team's collaboration. To build common knowledge, there is a need to build structures that allow knowledge to flow across practices (Edwards, 2010).

Excerpt 2 shows that one of the participants indirectly requested that the researchers clarify whether the way in which questions were raised to the students was problematic when collecting data for the mid-way report. Also, this finding may indicate a division of labor in the team in which the researchers became "teachers" of the team. Similarly, the researchers had the opportunity to ask several questions to clarify details of the leadership, teaching and student learning practices of the pilot schools. In this way, one could say that the situation created an opportunity for knowledge and experiences to flow from the schools to the university (cf. Edwards, 2010). The use of questions to make sense of evaluation as a situational object might be seen as what Vygotsky (1986) called physiological tools. The questions from both the researchers and from the other participants had a structuring and mediating role (Jensen and Møller, 2013). The implication of this finding might be to pay attention to the role of questions in leadership development.

When we examined what characterized the evolvement of objects within episodes in the context of the trajectory of the team, it was apparent that Episode 29 stimulated new evaluation practices. The change in a short period produced longer-term changes, such as the trajectory of two schools (cf. Lemke, 2000). Again, questioning existing practices appears to be crucial; however, these questions could be perceived as confrontational (Akkerman and Bakker, 2011). The importance of external views of school improvements for proceeding successfully has been emphasized in several studies (Møller, 1998). What occurs during the moments of leadership development within a small team is not only a "here and now" question; it is related to the developmental processes of the interacting activity systems. As can be seen from the analysis of Excerpt 1 and Figure 1, other activity systems (in this case, a national educational authority) were made relevant during moments of leadership practice. The trajectory of the application for funding, the mid-way report and the table of observations were all made relevant in the boundary work. Ludvigsen *et al.* (2011) found similar mechanisms in a group of students. Inspired by Roth (2001), Figure 2 illustrates this phenomenon.

When zooming out from episodes, it becomes evident that longitudinal trajectories are intersecting episodes of leadership development. This finding has methodological implications. To understand interactions in small units of time, it might be necessary to zoom out to interpret the interactions. The findings also suggest that leadership development is characterized as expansive learning because existing practices are questioned, examined and modeled, and a new model is tested and evaluated. As the team only lasted two years and the study only had self-reported data regarding changes in the schools, it would be more accurate to argue that leadership development in the



Source: Inspired by Roth (2001, p. 32)

Figure 2.
How longitudinal trajectories intersect episodes

team represented a potential for expansive learning through miniature circles of expansive learning (cf. Engeström, 2003).

Based on the analysis of the data regarding longitudinal interactions at different levels, it was possible to document the dimensions of leadership development that are usually difficult to document via surveys and interviews by spatially zooming in and out on leadership development to document spatial and temporal aspects.

The practical implication of the study is that one must be aware of boundary work's potential for learning as well as its challenges. The methodological result of the study is the enrichment of the body of research on leadership development via a multi-time analysis. The theoretical implication of the study is that CHAT should be used to study leadership development in boundary settings in other cultural contexts. A limitation of the study is its relatively small scale and its lack of empirical data from the interacting activity systems, which would document indications of expansive learning. To further extend this knowledge, further research is needed to document whether – and if so, how – leadership development takes place in teams and becomes transferrable to a real-world contexts.

Notes

1. "Factual texts" are factual explanations in students' textbooks within different subjects.
2. Pseudonyms replace the true names of the team members. P: Principal, A: Administrator, R: Researcher.
3. […] Because the length of the utterances, irrelevant parts are left out.
4. [ ] Comment by the author
5. "A mirror" is a written text describing practices, e.g. how a lesson or a staff meeting proceeds based on observation.
6. "A video paper" is presented as a power point presentation. The power point has links to video sequences.

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Appendix. Tools

Table AI.
The table below lists the 34 episodes and the situational objects found when analyzing the interactions of the ten team workshops, as well as the artifacts in use

Workshop	Episode	Situational objects	Tool
1	1	Teasing out how to implement shadowing and mirroring	The application
	2	Deciding when, how and where to introduce shadowing and mirroring	
2	3	Articulating needs and deciding how to collaborate about what and where	The application
	4	Analyzing a mirror from a teaching practice in Grade 10	A mirror[5]
3	5	Clarifying the collaboration itself and the way of working	A model
	6	Clarifying different types of mirrors	An illustration
	7	Analyzing a mirror from a leader's practice	A mirror
	8	Discussing strategies used when leading staff meetings	A mirror
	9	Discussing a situation experienced by one of the principals	
	10	Analyzing challenges in the context of a model	A model
	11	Discussing strategic work with staff	A model
4	12	Analyzing video sequences from a staff meeting	A video-paper[6]
	13	Analyzing video sequences from first grade	Video sequences
5	14	Analyzing video sequences from a staff meeting	A video-paper, and a mirror
	15	Analyzing a situation in a leader practice	Sequences in "Structured talk"
	16	Analyzing the goals of the project and how to reach them	
6	17	Discussing different perspectives on teachers' practices	A power point
	18	Analyzing challenges in the present situation of the local project	Sequences in "Structured talk"
	19	Analyzing a leader's challenges in the local project	A power point
7	20	Analyzing the aim of the project and intended result	Logs A power point
	21	Analyzing a leader's challenges	
	22	Evaluation and looking ahead	A power point
8	23	Analyzing the present situation in relation to the goals	The application
	24	Teasing out what the principals know about the students' reflective competencies	
	25	Teasing out how to push reflective learning	
	26	Teasing out what kind of evidence the principals have	
	27	Analyzing how practices are shared within the project and how to proceed	
	28	Analyzing how to understand a fictive case in the context of Vygotsky	A written case
	29	Discussing an evaluation report and the existing evaluation practice	An evaluation report (a mid-way report)
9	30	Discussing how to understand the goals in the application and how to collect data	A model The application
	31	Discussing how to collect new data	A model
10	32	Discussing how to understand a model of self-evaluation	A model
	33	Analyzing new evaluation results from two of the schools	The result
	34	Analyzing the present situation and looking ahead	

Corresponding author
Ruth Jensen can be contacted at: ruth.jensen@ils.uio.no