School leadership and educational change: Tools and practices in shared school leadership development

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Abstract This study examines the features of school leadership as it evolved in an upper secondary school attempting to enhance school improvement through a dedicated team of developmental leaders. We study the team leadership's tools and design over one school year and report on the evolution of a collective approach to leadership for school improvement. Researchers in a formative intervention research project supported the change process. Cultural-historical activity theory and a set of new technologies inspired the intervention design. The study describes how conceptions and practices of leadership gradually emerged as a collective and distributed approach to leading educational change and school improvement. In particular, new tools and designs for school team leadership were explored and implemented. The study addresses the need to develop shared and collaborative conceptions of leadership in schools. The study concludes that careful planning and skilful orchestration of human, cultural and technological resources are needed in order to make sustainable improvements in schools.

Keywords Shared school leadership · Distributed leadership · Educational change · Developmental work research · Cultural-historical activity theory

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Introduction

School leadership is considered crucial to the success of individual schools and educational change (Bryk et al. 2010; Elmore 2004; Fullan et al. 2006; Harris 2008; Hubbard et al. 2006; Stoll and Louis 2007). However, studies of leadership have often focused on the role and behaviour of the principal. This prevailing perspective runs the risk of overshadowing teacher teams, heads of departments (and other leading professionals) and the teachers who have been entrusted with leadership in their classrooms, all of whom contribute to the totality of school leadership. Indeed, studies addressing a shared or distributed perspective on leadership represent important steps in developing our understanding of the collective enterprise of school leadership and the complexities of leading educational change in schools (Gronn 2003; Harris et al. 2007; Rutherford 2006; Seashore 2009; Timperley 2005). However, this literature has indicated a mutual or reciprocal relationship between two levels of professionalism in running a school. First, the teachers are embedded in professional practices framed by a large set of societal expectations and institutional regulations, including systems of accountability and resource allocations. Second, the principal is entirely dependent on the teachers—especially their competencies and motivations for teaching and learning—to fulfil the overall aims of the school. Therefore, the task of leadership in general—and leading colleagues in professional work in particular—requires careful planning and skillful orchestration of human, cultural and technological resources in schools. In this situation, two sets of challenges face leaders in schools. One concerns the development of productive interfaces of leadership across different levels of teaching and teamwork in schools; the other relates to the development of sustainable professional teacher communities taking responsibility for leading teaching and learning.

School development studies have pointed to the need of fostering intra-organisational partnerships and networks of learning between teachers when working for sustainable change (Louis and Miles 1990; Hubbard et al. 2006). Collective and network-oriented approaches to school leadership also seem to characterise schools that exhibit the potential to improve (cf. Cardo 2006; Camburn et al. 2003; Copland 2003; Hallinger and Heck 1998; Harris et al. 2007; Murphy and Myers 2009; Rutherford 2006; Scribner et al. 2007; Southworth 2002; Timperley 2005). This means that leadership geared towards change is a joint enterprise involving leaders and teachers in a reciprocal activity of realising the organisation's core objectives. This concept of mutual dependency is fundamental for understanding the complexities of leadership and educational change (cf. Elmore 2004; Fullan et al. 2006; Murphy and Louis 1994). Approaches based on shared or distributed leadership advance the understanding of this intersectional zone of school development by directing attention to the 'concertive' actions of professionals (Gronn 2002) and their joint efforts in leadership (Woods et al. 2004).

Louis and Miles (1990) claimed that principals must relinquish some of their authority if they wish to have a real influence over the school improvement process; furthermore, they have to stimulate bottom-up change, vision building and instructional leadership at different institutional levels to achieve their objectives (p. 236). After evaluating the concerted effort of the comprehensive U.S. San Diego

school literacy reform (1998–2002), which was intended to improve instructional practices through sustained and focused professional development of teachers and educational leaders, Hubbard et al. (2006) concluded that the reform required considerable learning on the part of professionals in the system. School leaders also needed to learn new roles, and "moving from plant managers to leaders of instruction constituted a severe break with standard operating procedures for the vast majority of principals" (p. 247). According to Harris (2010), the ideal way to stimulate the development of successful schools is to remodel leadership roles and responsibilities, create new teams and distribute leadership more widely.

However, it is quite difficult to take the step towards implementing an extended institutional approach to leadership that includes the principal, heads of departments, team leaders and professional communities in schools. Such an approach is rarely described and discussed in the school development literature and thus requires further investigation (Halverson 2007; Murphy 2005). This implies a closer look at day-to-day leadership and management, including an interactive perspective on micro-level tasks, tools, organisational routines and leadership activity (cf. Spillane and Diamond 2007).

The present study focuses on the micro-level of the utilisation of tools and practices enacted by a new pedagogical leadership team (P-team) in an urban upper secondary school in Norway devoted to the enhancement of school improvement. The intersectional level of leadership and micro-practices is provided through a formative intervention approach inspired by developmental work research (DWR) (Daniels et al. 2009; Engeström 2007). Based on this, the study focuses on the following questions:

- What characterises the evolution of a shared and collaborative design for school leadership in an upper secondary school?
- What tools and practices support the development of the leadership model?
- What are the implications of shared and collaborative leadership for school improvement?

School history and research context

Hillside School (a pseudonym) has a history of transforming failure into success, particularly with regard to improving teacher recruitment and student learning outcomes since 2000. Six years after being threatened with closure, the school had become a national 'lighthouse' or 'demonstration' school, rewarded for excellent leadership and organisational development, teacher collaboration and systematic follow-up on student learning. The school has prioritised the development of information and communication technology (ICT) since 2005.

The need for new designs and tools supporting teacher collaboration and internal network building, i.e. the sharing of ideas and practices between teachers across institutional levels, was identified in a series of earlier research and development studies at Hillside School conducted over the past 6–8 years (Hauge et al. 2012). As researchers, we have participated in several studies experimenting with generic

tools for technology-enhanced teaching and learning (e.g. wiki tools). Teachers have been active participants in the research projects, ensuring that the interventions include endogenous interests, i.e. those of teachers, students and the institution, as well as exogenous interests, i.e. those of researchers (cf. Lund and Smørdal 2006; Lund and Rasmussen 2008; Hauge and Norenes 2009, 2010; Norenes and Hauge 2009).

The present study was based on an initiative taken by the principal as a follow-up and extension of the earlier research conducted at the school. The history of partnership with the University of Oslo over the years was a driving motive for delving further into organisational matters and leadership devoted to educational change. The principal, the pedagogical/school development leader team (in this study named the P-team), the student counselling team and the administrative team collectively comprised the formal leadership structure of the school. This present intervention study was organised in conjunction with the development of the P-team. The four assigned members of the P-team were all heads of key departments and ongoing development projects in the school. Furthermore, they had earned a strong reputation among their colleagues both as good teachers and department leaders. The principal played a leading role in the overall direction of the P-team's work; however, he did not interfere in their daily work and decision making. Together with the principal and the P-team members, we (the researchers) developed the intervention methodology and aligned it both with previous research conducted at the school and the situation at hand.

An analytical perspective on change

In conceptualising the intervention design, we drew on cultural-historical activity theory (CHAT) (Cole and Engeström 1993; Daniels et al. 2009; Engeström 1999, 2007). According to Engeström (1999, 2007), the basic functions in CHAT may be illustrated as shown in Fig. 1. The figure provides a general picture of the leadership system at the school before the intervention study took place. It illustrates a system of leadership based on the principal as the driving subject of activity in collaboration with a set of professional communities. The object of activity is the leadership of the school as a whole, including staff development and individual teacher competency building; however, all of these activities share the underlying objective of school improvement. At the beginning of this study, tools, rules, communities and division of labour between actors had not yet been organised into an enhanced system for school improvement.

Using CHAT as an analytical tool, we recognise in our study that culturally developed artefacts have a special status as fundamental mediators of actions, relating subjects and the object of activity in a dynamic three-way interaction. Leadership is taken as the main object activity, particularly with respect to how it is conceptualised, designed and redesigned by the actors in the intervention. However, since activity theory extends beyond individual practices to address collective and interrelated activities over time (Sannino et al. 2009), such an approach allows us to
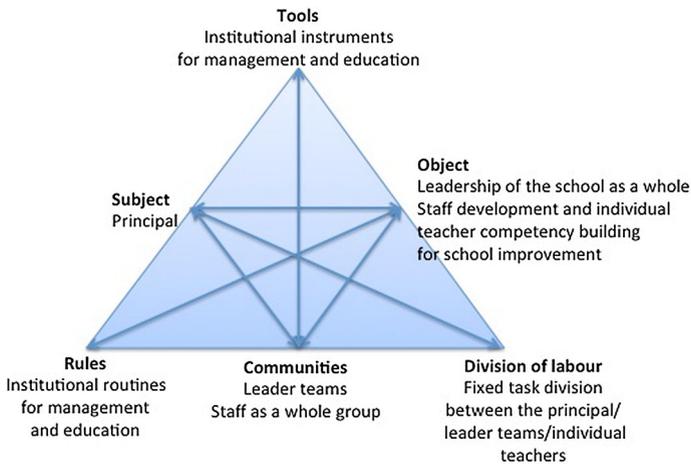
Fig. 1 The school leadership activity system—start position

look at the objects, tools and practices of leadership in interconnected institutional practices.

Research design and analytical approach

Inspired by DWR methods and approaches to expansive learning (Daniels et al. 2009; Edwards 2005; Engeström 2007), the formative intervention design comprises three levels of tools supporting the development of the P-team.

First, the intervention design was organised as a longitudinal work model in which the existing practices, tools and design of leadership were discussed in a neutral environment independent of daily constraints. A course of meetings and workshops (whole-day work meetings) with the principal and the P-team were organised during the 2007–2008 school year. Discussions were videotaped. Prior to and in between the workshops, the researchers collected observation data from discussions during team meetings which were then later scrutinised in the workshops. The agenda for the workshops was set up in collaboration with the principal and the P-team.

Second, the intervention design allowed for the use of CHAT as a tool and vehicle for analyses of leadership in the school, helping the participants to reflect on their practices. The basic dimensions of the activity system model illustrated in Fig. 1 were applied for supporting the reflection process. By engaging in the DWR process step by step, different sets of leadership objects and activities were discussed and elaborated with regard to institutional constraints (rules, communities, work distribution) and tools for management and change.

Third, the following digital technologies supported the use of the CHAT model and the documentation of changing practices and approaches to leadership. The Shared Space Wiki, based on the MediaWiki platform (www.mediawiki.org)

customised by Intermedia, University of Oslo, was designed to serve as a shared and open platform for information and communication between the researchers and school leaders during the DWR process. The VideoPaper Builder, developed by the U.S. Concord Consortium and TERC (2000) (http://vpb.concord.org/), enabled users to insert and interlink text, images and video resources and publish the combined resources as a user-friendly multimedia Web document. The technologies were introduced to mirror current practice in the school, including classroom practices and teacher team and workshop discussions. Table 1 provides an overview of all DWR-related activities and tool usage during the intervention.

Empirical data comprise video recordings of workshops and team meetings, field notes, project websites, and curriculum and strategy documents. The first workshop was held in December 2007 and the last was held in May 2008. Planning meetings started in June 2007. Timelines, activities and data types are shown in Table 1.

The unit of analysis, i.e. the focal point of analysis, is the object-driven activity of the principal and the P-team searching for purposeful tools and leadership designs. The unit is defined by the activity system construed to expand P-team leadership, which includes activities in the intervention design and the principal and P-team members' aligned activities at the school level.

Development of shared conceptions of leadership

We start by giving an overview of the workload distribution in the P-team to provide a context for understanding the leadership tasks at Hillside School and the time available to perform them. Then, by looking at a selected set of episodes, we analyse the changing conceptions of leadership that evolved during the DWR process (cf. Table 1) and the conditions of change. At the end of this section, major leadership conceptions are summarised through a meta-analysis of activities in the workshops by using an activity systemic approach.

Workload and pedagogical leadership activities

The ultimate aim of the P-team was to support and enhance school improvement and educational change. The partnership with the researchers aimed to clarify plans and practical designs of classroom work; develop tools to support teamwork and assist the P-team leaders in developing their understanding of leadership and strategies for school improvement. At the beginning of the project, to identify the amount of time and space available for this work, the researchers asked the P-team leaders to describe and assess their total workload and duties. The result of this first inquiry was as follows: 30 % of their time was devoted to teaching and classroom work; 25–40 % to administration and management (depending on the size of the department and work distribution with other management teams in the school); 10–25 % to student and staff follow-up work and 25–30 % to school improvement work. This workload mapping clarified the level of expectations for the project. Thus, the principal and the P-team leaders realised that they would have to struggle with competing work tasks to achieve the goals of the project.

Table 1 DWR timelines, data and activities

Activities	Date/time period	Empirical data	Actors
Phase A: Supporting existing development work	June 2007–February 2008		
Project initiation	June 2007	Contract/agreement document	Principal of the school, researchers
Project plan development	August–September 2007	Plan document	Principal, leader team, researchers
TPD model development, Shared Space Wiki integration	September – November 2007	Shared Space Wiki pages	Researchers, leader team
Observations	October–November 2007	Field notes from three leader team meetings	Leader team, principal
Workshop 1	December 2007	Video recordings, Shared Space Wiki pages	Leader team, principal, researchers
Follow-up work leader team meetings	January–February 2008	Field notes, use cases, Shared Space Wiki pages	Leader team, researchers
Phase B: Piloting teacher team development	March–June 2008		
Workshop 2	March 2008	Video recordings, VideoPaper, Shared Space Wiki pages	Leader team, principal, researchers
Planning and implementation of teacher team development work	March–April 2008	Video recordings, field notes	Leader team, two teacher teams (4 + 4 teachers) in math and Norwegian language
Follow-up meetings with leader team	March–May 2008	Field notes, audio tape recordings	Leader team, principal, researchers
Workshop 3	May 2008	Video recordings, VideoPaper, field notes	Leader team, principal, researchers
Follow-up meeting	June 2008	Field notes	Leader team, principal, researchers

Changing conceptions of leadership

Two distinct phases of leadership were observed during the DWR period. The first one mirrors an open and inquiry-oriented attitude towards the roles and tasks of developmental leaders; however, the activity was strongly influenced by existing and former plans of development work in school. In the second phase, the P-team transformed their roles and tasks into a more autonomous and advanced level of leadership.

Phase A: Supporting existing development work

The starting point for the development of roles, functions and practices in the P-team may be illustrated with the following utterance from the principal in Workshop 1, in which the participants were discussing goals and actions for their development work.

> **Extract 1: The emerging vision of leadership.**
> **Principal**: When we established the leader team, it was a way of thinking, an aspiration to focus more broadly on pedagogical practice. We wish to collaborate with the teachers to elaborate teacher professionalism and educational quality, and as a result the students will learn more and they will complete and pass their exams. You could say that there are many ways of doing such a thing. We have to choose some development fields. Let's say that we choose student assessment. Assessment is a very significant field of work, so we have to monitor it. And what are the issues connected to assessment that we wish to examine? What are we going to focus and work on in connection with assessment? That will give us a better insight into and understanding of practices in our school.

This extract reflects the open and inquiry-oriented approach to the DWR process that characterised the initial phase. The principal stated that Workshop 1 would play a significant role in furthering decisions about goals and actions in the project. During this meeting, *student assessment*, or more precisely *assessment for learning*, was identified as the main work task for the P-team and the main tool for leadership advancement. Historically, such assessment was addressed in several of the school's previous development plans, but the P-team argued that it still needed to be nurtured and elaborated into an advanced institutional practice. The motive for choosing the topic was aligned with the fact that all teachers in the school were already involved in extensive follow-up assessment of individual students. At the end of the workshop, the P-team decided to use *portfolio assessment* in interconnected leadership practices as the main artefact for expanding student assessment. Discussions between the principal and the P-team leaders revealed a diversity of motives for the work on portfolio assessment; however, all the participants seemed to share an aspiration to widen and further explore the practices. This is illustrated in the following extract.

Extract 2: Tensions between objects of leadership.

P-team leader A: This is also about how we in the P-team should work; dare to think in the long term. We are in a phase where we don't know how to work together as a team yet, and that takes time.

Principal: I agree. We have to be clear.

P-team leader B: We have a portfolio project that will last for a year, but also a staff seminar in Barcelona. It's important that we settle matters quickly in all phases because of the time.

Principal: If we decide during the day that this is the object and this is what we are researching, then we will state it very explicitly. We will research and enquire about this.

P-team leader B: I will add that the portfolio group already has high ambitions, and possibly they have to rethink their work in order to focus on this project.

P-team leader D: How do we work with the students?

Principal: It is important to consider that we are working together with professionals who give us considerable insights and can help us to dig deeper into this.

P-team leader A: We have to remember the staff seminar where there will be presentations related to the use of the portfolio project.

P-team leader C: We will not terminate the portfolio project this summer. We are working to find a good design to expand the project.

Extract 2 reveals a contradictory situation for the development of leadership tasks and priorities. The team members had to follow up on a staff seminar dedicated to the use of student portfolios and they were concerned about how to expand the project. They had to define goals and tasks for the new leadership project. The workshop ended by identifying the portfolio assessment project as a starting point for team building and leadership learning. However, the work on portfolio assessment would be connected to a larger initiative for the improvement of 'assessment for learning' in the school.

In the follow-up meetings with the principal and the P-team after the staff seminar, the researchers and school leaders agreed on describing and exploring portfolio practices in the school in relation to the tasks of leadership development. Then, the team members worked out a set of portfolio descriptions to be discussed. These descriptions were also made available in the Shared Space Wiki space and were discussed in subsequent meetings. As this work was conducted and strategies for leadership were discussed, the complexity of the portfolio object became even more evident.

Intermediate phase: Stirring things up

The team members encountered a turning point in their way of thinking when the principal (in between Workshop 1 and 2) argued that the project was moving too far into 'micro-level analyses'. He argued that the chosen approach would be unproductive for the development of leadership as an institutional practice.

Utilising a rhetorical twist, he described this insight as a revelation he had received during a strenuous cross-country skiing excursion.

>   **Extract 3: A change in leadership orientation.**
>   **Principal:** What kind of leadership strategies do we opt for next year? It's possible that I was too exhausted at that cross-country skiing excursion to think clearly. What are we aiming for—and what is our development strategy? We have many different levels that we can focus on. But maybe the teacher team level—that would at least be compatible with the other efforts for school development.

Throughout this intermediate phase the principal became the spokesperson for shifting their leadership away from supporting individual teachers in pilot project learning towards leadership at the collective level of teacher development, particularly the development of teacher teams (i.e. subject teachers working collaboratively across student groups). The major concern was that the P-team had too little knowledge and control of the work being carried out in all the teacher teams, in contrast to the follow-up work of individual teachers in the school. The next extract from Workshop 2 illustrates the shift and extension of perspectives regarding team development.

>   **Extract 4: System for teacher teams.**
>   **Principal:** Yes, I'm just thinking about team development, because that is the exciting matter here. I've thought about how we actually are in a phase of organisational development, where we now have good follow-up routines for individual teachers. And now we have teacher teams, they are a bit adrift—we have some aims for the teams but they are adrift for the time being, and they aren't used as a field for intervention and improvement. The quality of that work is given little attention from us as leaders.

Other members of the P-team stressed that each of the teacher teams in the school functions very differently. These differences were also discussed in terms of how to work with the teams and what type of leadership approaches would be appropriate to stimulate their development. It was in this context that the idea of 'super teams,' i.e. teams for change, was conceived during Workshop 2. The idea behind the super team is guided by the P-team's need to gain experience in leading groups of teachers as a collective in order to perform school development work. Extract 5 from Workshop 2 underlines the changing conceptions.

>   **Extract 5: Creating a teacher team model.**
>   **P-team leader A:** We have to create a model that can inform us as leaders about what is actually going on in the teacher teams. Not just that you will run a project that we will be involved in and govern, but we want to create systems in order to follow up, know and be tightly involved in the existing development work. We have structures for leadership approaches at the individual level, and now we want to establish structures and approaches for follow-up work at the team level.

The conception of teacher team development seems to play a dual function for the principal and the members of the P-team. In addition to serving the top-down

needs of controlling and following up with teachers' work, it would also be a means to empower teachers and encourage them to assume responsibility for school development at a collective level. This new understanding moves the leadership thinking into development Phase B.

Phase B: Piloting teacher team development

The changing perspectives on leadership which emerged during Phase A and onwards allowed interests and activities to develop gradually into tasks at the institutional level and the P-team's support for teacher team development. Support for individual teachers and further institutionalisation of portfolio assessment were still objects of school development, but tools and levels of interaction between teachers were changing as new structures and strategies for collective teacher professional development emerged. Consequently, Workshop 2 was devoted to analyses of the practices, tools and design of teacher team development; while these were planned for implementation during the next school year, they were explored and piloted throughout the rest of the DWR intervention period. At this point, a selection of video episodes from the former VideoPaper project (cf. Hauge and Norenes 2010), focusing on how a team of mathematics teachers discussed their classroom practices of student assessment and made efforts to understand each other's approaches, were brought in by the researchers to support the model discussion and to clarify teachers' way of thinking and collaborating. The following three discussion extracts reflect different aspects of the new and expanded understanding of leadership that emerged in Workshop 2. In Extract 6 from this workshop, the P-team focuses on how to develop experiences of leadership connected to teacher team model development.

> **Extract 6: The need to explore teacher team models.**
> **P-team leader C:** A very tangible assignment, I figure, is that these teachers (*she refers to the video and the current teacher team*) wanted time to work on curriculum planning and student assessment. They have requested a day for that. I feel it would be helpful to work with P-team leader A again, or one of the other members—and we could try to think of a model for working with a teacher team on just that. It would be an opportunity to reflect on it and use it as a model for that type of team next autumn.
> **P-team leader A:** If the idea is to do research on our own practice, we also have to consider what experiences we as a leader team already have that we can develop further. You (*she looks at P-team leader C*) have worked very much on this matter, and you have made many useful contributions that have generated a great deal of reflection. If I am going to be a process leader in a team, then I have a need to gain insight into processes, build a model and learn how to use and reflect upon it.

The discussion in Extract 6 reveals the need to learn more about tools and methods that can support the leadership of teacher team development. The extract shows that while the members of the P-team were open to future challenges, they were also asking for reliable models and methods that could support the teacher team

development work. In this discussion, it is also evident that ideas and approaches to problem solving were stimulated and facilitated by watching the video episodes featured in the VideoPaper. However, how to anchor and exercise school leadership supporting teacher team development at different levels in the organisation still remained an open question, as illustrated in Extract 7 from Workshop 2.

> **Extract 7: Student assessment as a leadership task.**
> **P-team leader A:** We need to know what happens and which decisions are made in the organisation in general. (*P-team leader A approaches the whiteboard.*) What I was thinking was to expand this model (*she draws an assessment model*). If we discuss the issue of assessment, then we have the assessment in the middle. Then we have aspects that deal with assessment of and for learning—and there we have issues concerning law and order. And what we do is decent when it comes to the overall governing guidelines that we have to act in accordance with. Another box is systemic understanding, related to competence.
> **P-team leader C:** What do you mean by understanding a system that is related to assessment?
> **P-team leader A:** I think of what we have to relate to and in what manner we have to relate to it. And if we work with teachers on assessment for learning, they have to understand, and therefore there has to be competency about where this comes from. What is the connection? Is it something we have made up, or is it rooted theoretically, politically or organisationally? There is one field dealing with the procedures. But underneath this we have the portfolio, the midterm and the ICT-assessment. What is our basis for assessment? We need a discussion of the concepts and their interpretations. We have worked extensively on development plans—how is assessment integrated into them? And what about the criteria for assessment? We deal with all these issues that together constitute the field of assessment for learning, right?
> **P-team leader C:** And then we have the connection between the two again—*of* and *for* assessment.
> **P-team leader A:** Yes, we have to dig into it. And what issues in connection to assessment are we really talking about? Here we are at different levels in our work, and where we exercise leadership.

Extract 7 reveals how the P-team leaders are struggling with defining the field of student assessment and the systems of supporting and developing the field in the organisation. It follows that the object of assessment becomes even more complex than it seemed to be during the initial phase of the DWR process. At this stage of the development, the social and pedagogical infrastructure of the school is discussed as a significant part of the assessment object. Thus, the P-team chose to explore student assessment, not as an educational method in itself, but as a means for the teacher team development and organisational development. To further illustrate the motive of leadership in the field, Extract 8 from Workshop 2 shows how the P-team leaders are returning to the fundamental questions of student assessment and learning. It also highlights the role of leadership in student learning and teacher learning.

Extract 8: Reflections on student learning, teacher learning and leadership.
P-team leader C: The challenge in that math teacher team (*commenting on the video*) seemed to be as follows: how can we get more students to verbalise their knowledge more often?
P-team leader A: I was thinking of a comment, and then I thought "What is the learning outcome like for those who get an explanation"? Then, I think they will move one step upwards. To what extent do they reflect when they explain? What do they grasp? They (the math teachers) see it so clearly for the students. How does it influence their practice?
Researcher 2: They (the math teachers) were not able to take that meta-perspective.
P-team leader C: That is what I am thinking. The first thing that comes to mind here is that we have two students that don't get it. I am thinking, "How can I organise this activity in order to reach everybody in the student group"?
P-team leader A: Because if I had explained it, it is not certain that everybody would have understood it.
Researcher 1: What is important to you—as a teacher you are expected to carry out the lesson plan and explain the subject matter; that's your job. You have presented it, and then the students have learned it. Then you are on safe ground when it comes to documentation. This creates great dilemmas.
P-team leader C: Yes, the obligation of accountability.
P-team leader A: But there we are, as leaders too. Aren't we doing exactly the same thing? But here we have the opportunity to facilitate learning for the teachers in the teacher team—the teachers have to take that role in the teacher team. We—in the P-team—do not have to fulfil that function.
P-team leader D: In a way, when you are a pedagogical leader, however, you are sort of a teacher for teachers. How is this done pedagogically for the teachers? What kind of leadership strategies do I use to make sure everyone in the team is included and understands the work to be done?

In the first part of Extract 8 (which is based on the story from the video episode), the P-team leaders engage in discussion about learning when students are asked to explain their understanding. The dilemmas in teaching a diversified group of students are also discussed. Then, the P-team leaders express their concerns about the lack of meta-reflection in the teacher group about student learning. At the end of Extract 8, an important shift in the perspectives on learning occurs when the P-team leaders begin to look at themselves as leaders assisting teachers to improve their practices. Questions regarding leadership for learning among teachers and the role of the P-team in this process are raised as part of the agenda for teacher team development at large in the school.

As a follow-up on these workshop discussions, the P-team took a leading position in two pilot teacher teams organised for the purpose of exploring teachers' student assessment practices. The teams taught mathematics and Norwegian language, respectively. The teacher team meetings were video recorded and discussed in the final Workshop 3. In this setting, the leader team expressed a leadership concept quite different from that which was discussed at the beginning of the project

focusing on developing student assessment practices and individual teachers' competency development in general. The leaders now talked about how to identify everyday practices and how to document practices. They discussed the importance of systems, structures and strategies for follow-up work with teacher teams. Furthermore, they talked about specific competencies and methods of leadership that had to be contextualised.

Meta-analysis of tools and practices

The leadership conceptions and activities explored above were validated against supplementary information developed from a series of content analyses of video episodes, field notes and observations during the DWR process. In the research group discussions conducted over the course of several months, the data were utilised to provide a condensed view of P-team's practices and leadership development during the intervention. In the first workshop, we observed how a diverse set of leadership objects (staff development, student/portfolio assessment, individual teacher development) directed the P-team's activities. The P-team's leadership identity was very much aligned with being a teacher and helping individual teachers improve their work. At this stage of development, the P-team members were working quite independently but shared a set of common tasks connected to pre-planned staff meetings and development projects. Existing routines and tools for school management framed the work. At this point, the principal was the driving force in defining tasks and activities to be undertaken by the P-team. From the second workshop until the very end of the intervention, a new set of development tasks emerged as part of a continuous discussion between the researchers, the principal and the P-team regarding the means and ends of school team leadership. We see that new structures and routines for supporting teacher team development were developed (e.g. organising pilot teams, enhanced team leadership), and that tools for communicating about and reporting on teacher teamwork were explored (e.g. face-to-face meetings with team leaders, video recording of team meetings). We also observe that the institutional framing of school improvement-oriented work distribution between the principal, the P-team, and the team teachers was questioned and explored in new ways. After Workshop 2, the principal and the P-team became more unified as leading subjects of the activity. Workshop 3 was held at the end of the school year, and it confirmed an expanded way of thinking about school leadership and school improvement. A collective way of working with teachers, supporting teacher team development and reinforcing competencies was developed by the end of Workshop 3. At the end of the intervention period an expanded version of the object of the pedagogical leader team's (P-team) activity was constructed based on a distributed way of thinking and acting in leadership.

Three main digital tools (in addition to cell phones and email) supported the principal, the P-team and the researchers in the DWR process. The school's Learning Management Platform (LMS) served the major daily needs for written documentation of planning, reporting and communication between the school
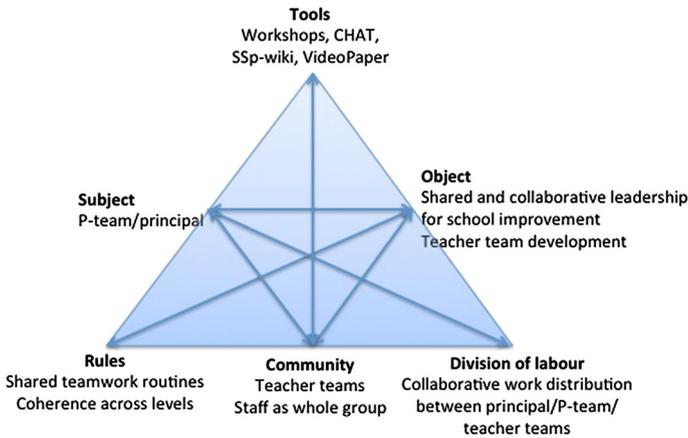
Fig. 2 The school leadership activity system—final position

leaders. The researcher-initiated technologies, Shared Space Wiki and VideoPaper, were added to the DWR process to facilitate workplace analyses and developmental research activities between the participants. These two generic tools played a major role in the DWR process, and were especially designed to support descriptions of practices, the use of video data for reflection and the continuous documentation of workshop discussions.

The end position of the DWR process regarding approaches to leadership for the principal and the P-team may be summarised as illustrated in Fig. 2.

Compared to the starting position of the DWR process (cf. Fig. 1), Fig. 2 illustrates that the subject of the leadership activity system has been reconstructed and empowered by the P-team; although the principal is still part of the subject of activity, he now shares his position on an equal basis with the P-team. The changes are reflected in the object of activity focusing on shared and collaborative leadership for school improvement and teacher team development. The double-bounded object of activity at the beginning of the DWR process, focusing on staff development and individual teacher competency building, has been transformed and narrowed into a collective unit of change in the working organisation. This change process is supported by a set of tools for observing, analysing and discussing classroom practices and teacher team practices provided by the researchers in the DWR process. Among these tools, Workshops 1–3, the CHAT principles, VideoPaper and the Shared Space Wiki all played significant roles as drivers for the reconstruction of the object.

During the intervention we witnessed how the principal and the P-team gradually revised the expectations and rules for teacher team development and how practices were discussed for the sake of educational change and coherence across levels (e.g. teacher team development). The division of labour between the principal and the P-team underwent important changes during the intervention, thereby enforcing the authority and autonomy of the P-team. Furthermore, pilot teacher teams were given

significant roles in developing experiential knowledge addressing student assessment practices to be discussed by other teacher teams.

Discussion

School improvement was the driving motive for leadership change at Hillside School. In the study, we observed a significant change in the object of leadership and how mediating tools contributed to the simultaneous narrowing and expanding of approaches to school improvement. The changes comprised the following two fields of development: (a) the leadership task and structure, and (b) the work distribution between the principal, the pedagogical leader team and the teachers. At the start of the intervention, the pedagogical leader team was very concerned about disseminating innovative student assessment practices by utilising the best practices of portfolio assessment in the school (e.g., by organising staff seminars devoted to the sharing of portfolio experiences). At the end of the DWR process, the improvement strategy had changed; student assessment was viewed as a far more complex entity and practice than at the beginning, and as a result it had to be discussed more thoroughly and solved by teachers through team development work. Then, the leadership for change was transformed into a bottom-up strategy supported by the P-team. At this point, we observed an emerging institutional perspective on change that was based on a more advanced understanding of the development task and the organisational structure of the school than we saw at the beginning of the DWR process (cf. similar conclusions in Louis and Miles 1990; Hubbard et al. 2006; Murphy and Myers 2009). In this change process we observed a focus shift from the individual teacher to the teachers as a collective for development work. For the school leaders, i.e. the principal and the P-team, an intra-organisational strategy for network building and learning emerged as a more sustainable means of school improvement (cf. also Louis and Miles 1990; Hubbard et al. 2006). Thus, the DWR-supported change process seemed to lead the way to a 'concertive' and reciprocal approach between leaders and teachers in improving teaching and learning (cf. Gronn 2002; Scribner et al. 2007).

A new set of cultural and theoretical tools came to play an important role in the change process at Hillside School. The DWR workshops enabled a 'neutral' place (cf. Engeström et al. 2003) for open discussions of practices and conditions for change among the school leaders. Together with the analytical CHAT perspectives, adapted to the context, the workshops provided a necessary distance from the constraints of everyday work and gradually became new tools for reflection and decision making. Thus, the workshops evolved as mediating means for reconstructing and remodelling the object and design for leadership and school development. The object of leadership expanded as new tools and practices for leadership and school improvement were constructed. In this process, the principal and the P-team took new initiatives to (a) enhance teacher participation, competency building, community development and collaboration, and (b) to involve teacher teams at different levels in the process of change. Thus, the leadership object, i.e. its conceptual meaning, motives and activities, developed in conjunction with the

participants' emerging understanding of the complexities of the context, tools and tasks for leadership and school improvement.

The generic technologies (Shared Space Wiki and VideoPaper) used in the study played a vital part in the planning and organisation of the workshop discussions and in giving feedback to the school leaders during the intervention process. From the researchers' perspective, these tools were necessary means for linking discussions of leadership and classroom work to the work history documented in video recordings and the minutes of meetings and workshops. They provided a virtual space for reflection on experiences and documented practices. It enabled the participants to analyse the objects at work on a deeper level by utilising a set of 'neutral' representations of the school leaders' conceptions and activities (cf. Engeström et al. 2003; Norenes and Hauge forthcoming).

In this study, we have researched how the object and design of school leadership for educational change moved from a top-down led activity into a shared and collaborative activity led by a developmental team of leaders. We observed the evolution of a distributed approach to leadership and how it was strongly linked to changing tools and routines at work and collaboration with teachers, similar to Spillane and Diamond's findings (2007). Furthermore, similar to studies conducted by Elmore (2004), Fullan et al. (2006) and Murphy and Louis (1994), a significant change occurred when a mutual and reciprocal relationship with teachers (in our case, developmental teams) was established to nurture and lead the classroom developmental work. The findings underline the importance of a shared, network-oriented approach to leadership as a way for making sustainable educational change (cf. for example Louis and Miles 1990; Hubbard et al. 2006; Murphy and Myers 2009). Furthermore, this study reveals the necessity for the principal to give up some of his/her authority to stimulate a bottom-up improvement process among the staff and to build shared leadership across institutional levels (cf. Louis and Miles 1990).

Conclusions

In this study, the following important lessons were learned:

- To really understand the challenges of school leadership and educational change, it is necessary to look at how institutional designs for leadership constrain and support school improvement. The study supports the research on leadership in successful schools that points to advanced team leadership and distributed leadership as vehicles for change (Bush and Glover 2012; Harris 2010; Lahtero and Kuusilehte-Awale 2013; Møller and Eggen 2005).
- It is necessary to stimulate daily work descriptions and analyses of system-related contradictions in school leadership in order to improve leadership as a collective endeavour across levels in school. We argue that CHAT perspectives (Daniels et al. 2009; Engeström 2007) are valuable means to analyse school leadership and advance the understanding of distributed and team-oriented approaches to school leadership

- Cultures and structures in a school are significant constraints for school leadership and school development. In this study, a new set of theoretical and technological tools is introduced to alter prevailing practices and to develop a shared and collective approach to leadership and school improvement. The intervention strategy based on CHAT principles, DWR methods and multimedia technologies (Videopaper, Shared Space Wiki) has piloted an alternative approach for future studies of school leadership change (cf. Leithwood et al. 2008; Hallinger and Heck 2010; Seashore 2009).
- We have followed a principal who knows how to read the institutional and social context of Hillside School. He knows how to support agents of school improvement and how to connect people to tools and resources in goal-oriented actions for improvement. These are important leadership skills for educational change and improvement (Fullan et al. 2006; Seashore 2009).

The study confirms the institutional complexities of organising leadership at the interface of interconnected practices in school (Bryk et al. 2010; Copland 2003; Harris et al. 2007; Murphy 2005; Seashore 2009; Stoll and Louis 2007) and the challenges of developing sustainable professional communities across institutional levels (Liebermann and Miller 2008; McLaughlin and Talbert 2006). In general, the study contributes to the understanding of how shared and collaborative leadership is initiated and how it may support the overall task of school improvement.

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