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Chapter

The Researcher's Role: An Intervention Study Using Lesson Study in Norway

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Abstract

The aim of the study has been to investigate the researcher's role in an intervention study using Lesson Study as a mediating artifact for teachers' professional development. The research question addressed in this article is: "How can the researcher act and react to the challenges that emerge when enhancing the development of practice and still allow teachers to own and manage the project"? An argument for this study is that there are several studies that point out that the researcher's role in intervention research in which teachers and researchers cooperate are of great importance. At the same time, little research describes the researcher's role and function during a research project. This article describes and explores the researcher's role in facing challenges in a practice-oriented intervention during the study. This study lasted for a period of two years. To answer the research question, I have used several data sources to get a holistic picture of the researcher role. Data sources consist of interviews, teacher's reflection notes, research log and observations. This study verifies that the researcher's role and approach are of crucial importance for change and development.

Keywords: researchers' role, intervention study, Lesson Study, CHAT (cultural historical activity history)

1. Introduction

Several countries have invested considerably in teachers' professional development [1]. To date, professional development for teachers has been largely based on formal approaches, such as professional development programs, mentoring, courses and workshops, and introductions to new methods and techniques [1–3]. According to Opfer and Pedder [4], formal approaches that are characterized by isolated events do not give due consideration to the fact that teachers' professional development is part of a complex system that encompasses individual teachers, interactions between multiple teachers, school systems, and teachers' dealings with them. In the field of research and development work in schools, interactions between teachers, school management, interventions and often external researchers, must also be considered, adding another layer of complexity to the system overall. Recent research has indicated that both schools and teachers strive to facilitate constructive and meaningful inter-teacher interactions that will promote teachers' development within this complex system ([5–7]; Norwegian [8]).

Studies have also demonstrated that, despite increased interest in collective learning and the popularity of collaboration between teachers, few changes have been implemented in practice and major revisions are rarely enacted [5, 9, 10].

An expert group on the teacher's role [11] appointed by the Norwegian Ministry of Education, particularly recommended that researchers and teachers should cooperate more closely on research and development work aimed at improving of schools and teaching practices. The group also emphasized the necessity of strengthening the role of research in the organization of teachers' workloads and in cooperative activities among teachers. While a more robust culture of research collaboration between researchers and practitioners is undoubtedly a priority, Norway's Ministry of Education [8] noted a dearth in researchers with sufficient expertise. This is supported by Nilsson and Postholm [12], who have found that there are too few researchers and teacher educators in Norway with the necessary competence to conduct research based on development processes. This is also supported by Tan [13] who believes that the challenge posed by the lack of researchers with the relevant expertise is also an international problem. Insufficient consideration has been afforded to the quality of the researcher's role by policymakers and education experts who front the agenda and promote teachers' professional development [13].

This article focuses on a practice-oriented intervention study in which the researcher and the participating teachers collaborated with the aim of improving teaching practice to optimize students' outcomes. The study's primary objective was to investigate the researcher's role in intervention research of this nature, and Lesson Study (LS) was the method used to structure and organize the developmental work. Burner [14] emphasizes that intervention means disrupting teachers' existing practice in some way or other and points out that researchers must be mindful and considerate of this. In intervention research that involves collaboration between teachers and researchers, the researcher must consider two types of reflexivity [15]: epistemological reflexivity wherein the researcher considers their own values and understandings, and methodological reflexivity wherein the researchers evaluate their own impact on their respective fields of practice.

The study was carried out from September 2015 to April 2017 at a small Norwegian school that covers grades 1 to 10 (students' ages ranged from 6 to 15 years). For the purposes of the study, the teachers were organized into six teams, four at the elementary level and two at the secondary level, and all teachers at the school participated in the LS project. My focus in this study was on the researcher's role (i.e., my role) in working with the two secondary teams.

My research question was as follows: *How do the researcher act and react to the challenges that emerge when enhancing the development of practice and still allow teachers to own and manage the project?* To answer this question, I will describe and analyze how I (the researcher) dealt with the challenges and opportunities that arose, with the aim of providing a thinking tool for other researchers in similar projects. Before presenting my findings, I will describe the theoretical and methodological framework used and how I, as a researcher, behaved during the study. Finally, I will analyze my findings in the light of relevant theoretical perspectives and research that supports these findings. First, LS is introduced briefly below.

1.1 Introduction to lesson study

Lesson Study (LS) is a method aimed at enhancing teaching and building pedagogical knowledge involves a group of teachers who wants to improve aspects of their

teaching and to optimize their students' learning experiences [16–18]. LS is a classroom inquiry method in which a group of teachers meet regularly to collaborate regarded to planning and teaching and to share observations, reflections and analysis related to their teaching and students' learning experiences. In LS, teachers assume an active role in exploring and refining their lessons for improved teaching and learning [19]. Lewis, Perry, and Murata [20] emphasize that LS processes are largely owned and led by the participants, in that they are practice-oriented, school-based, and facilitate the sharing and building of knowledge. The notion that LS are owned and led by the teachers is contestable: Takahashi and McDougal [21] claims that in Japan, where the LS method was originally developed, LS always includes a researcher or an external *knowledgeable other* who participates as a facilitator to support the process and to challenge the teachers. Most LS projects outside Japan are executed by teachers without the participation of researchers or *knowledgeable others* [21]. Takahashi [22] insist, however, that studies implementing the LS method require an external researcher or *knowledgeable other* who can: (1) provide access to a deeper understanding of the content the teachers are investigating and, (2) offer perspectives on the LS work and process that differ from those of the teachers. Takahashi [22] also emphasizes how important it is for researchers to assist others in learning how to reflect on teaching and learning.

The overall focus of the LS groups in this study was related to challenges facing teachers with regard to students' writing in various subjects. An overall goal was that teachers should augment their knowledge of teaching and their understanding of students to improve their teaching practices through collective development processes. Lewis [17] asserts that knowledge acquisition with regard to students' thinking and learning process and ways of improving teaching practice are two essential principles of the LS method.

2. Theoretical framework

Cultural historical activity theory (CHAT) was adopted as the theoretical foundation and framework for this research. Intervention studies based on CHAT aim to promote changes in practice by means of interventions that create new content in various parts of the activity system [23]. The researcher's role in interventions based on CHAT is to promote and maintain an expansive learning process led and owned by the teachers ([24], p. 15). Research that adopts a CHAT approach, therefore, examines participants' interactions and social constructions, and aims to improve practice while the research is being conducted [25, 26]. It is important that the researcher enter the field with a reflexive approach; this requires the ability to reflect introspectively on his or her own values, thoughts, and actions and to modify these in accordance with the field of practice [15]. In qualitative research, a process wherein the researcher reflects on his or her own role is described as a *reflexive process* [15, 27, 28].

The researcher (myself) and teachers (participants) involved in this research shared the objective of developing the teachers' teaching practice and cooperated toward common purpose of building knowledge, enhancing teaching, and optimizing student learning. However, a researcher may be confronted with various challenges in collaboration with teachers with regard to fundamental pedagogical perspectives, the establishment of trust between participants in the community, cooperation between teachers, the intervention itself, different perspectives on approaches to professional development, and research and development processes that need to be addressed [22, 26, 29]. Intervention research and development work conducted within the

CHAT framework always constitutes a dialog between the researcher and participants [24], meaning that it is neither the researcher nor the participants alone who set the guidelines for the process. The focus and direction of the work is determined in dialogs between the researcher and the participants, and, therefore, it is crucial that meaningful dialogs are created and maintained among the research community. In this study, participants actively explored and researched their own practices, though they were not characterized as researchers.

In any given activity system (in this context, the school), the community is likely to hold different views and divergent interests, which may give rise to tensions and contradictions [30]. CHAT is a dialectical theory, and the dialectical terms "tensions" and "contradictions" are crucial [24]. According to Engeström [30], tensions and contradictions are potential sources of change and transformation. Vygotsky [31], on whose thoughts and ideas CHAT builds, emphasized the use of language as a mediating artifact, as when teachers plan or reflect cooperatively. In the context of individual learning, Vygotsky introduced the concepts of the *actual development zone* (ADZ) and the *zone of proximal development* (ZPD). The ADZ defines what a person thinks and does alone, whereas the ZPD represents the difference between what a person can do alone and what he or she can do with the help of a competent other. Engeström [32] adapted Vygotsky's individually oriented concept of the ZPD to promote collective activity to a greater extent, seeing it as "the distance between the present everyday actions of the individual and the historical new form of the societal actions that can be collectively generated" ([32], p. 174). The researcher's role is to promote and maintain an expansive transformation process that is led and owned by the teachers ([24], p. 15) and, together with the participants in the project, to be a competent other. This relates to Takahasi's [22] emphasis on the important role of the researcher or *the knowledgeable other* in interactions of this nature, wherein the researcher supports the teachers' work by encouraging what they are doing well, asking questions and by challenging them with other perspectives and critical thinking.

Engeström [33] demonstrated how colleagues can develop and generate new learning conditions together by adopting an inquiry-based approach. He subsequently linked this to the concept of *expansive learning.* This requires teachers in professional learning communities to be willing to investigate their own practices with the aim of exploring and developing *something that is not yet there* ([24], p. 2). Fundamental to the LS method is the exploration of challenges and problems related both to teaching and the students' experiences. LS aims to better understand and resolve the challenges that teaching practice presents [20, 21]. Experimentation with new teaching methods in response to challenges and problems is key to improving teaching; the focus is on developing practices that are *not yet there.* In this way, CHAT and expansive learning together form the overarching framework, while LS functions as a mediating artifact for learning and teachers' professional development.

3. The researcher's role

3.1 Related research

In an action research study Postholm and Skrøvset [34] emphasized the importance of the researcher's reflections on their own role during the research period. They described three factors that are of particular relevance to the present study. First, they pointed to the importance of the researcher having communication skills and

an attitude that signals symmetry with the participants; this is crucial for creating and maintaining a research community. Second, they focused on the importance of the researcher's ability to redefine their own role and to adjust content and direction during the research period; this can for example, mean that an ongoing project may be steered in unexpected directions or that teachers' desires may change mid-process. The third important factor is the researcher's awareness of the need to establish complementary relationships and trust among the participants. Hargreaves [35] observes that it is only when the participants trust the researcher that they feel emboldened enough to raise questions and voice thoughts without experiencing concern that their professionalism, competence, or knowledge is being called into question.

In a study combining LS and microteaching, Fernandez [36] emphasized the importance of the researcher's ability and willingness to support and challenge teachers in processes of analysis and reflection related to their practice. Fernandez [36] also highlights the researcher's role in maintaining focus on the overarching goal as well as the researcher's ability to collaborate with the participants in a way that ensures both parties, (i.e. researcher and teachers) learn within the project. In a study concerned with teachers' learning processes, Tan [13] focuses on the researcher's ability to encourage new ways of thinking about teaching and learning and new approaches to organizing and enacting teaching. Tan also believes that policymakers afford insufficient attention to the quality of the researchers who front the agenda for promoting teachers' professional development, claiming that the researcher's role is often taken for granted [13]. In a collaborative project between researchers and teachers, Jung and Brady [37] identified the importance of the researcher's ability to launch the discussion within the research community and to address teachers' concerns and challenges.

3.2 The researcher's role in this study

My role as a researcher, as communicated to the teachers in this study, was to lend support and be a driving force in the developmental processes. This necessitated finding a balance between the need to provide support and the need to drive the process forward, while ensuring that the project was managed and owned by the teachers [22]. I was, therefore, concerned not only with understanding the social interactions and the social structures among the participants, but I also shared with the teachers' aspiration that the project would contribute to improvements in their practice.

As a researcher, being a participant observer in the various LS processes gave me opportunities to gain a broader insight into the teachers' thoughts about teaching and about the challenges they experienced in their practice. Through critical reflective thinking and by challenging the teachers' "commonsense" beliefs about teaching [15], I could seek to promote and maintain an expansive transformation process [24]. Given my own professional background (I was a teacher for several years), I was also aware that I was entering a field of research and practice with which I am familiar.

4. Methodology

This paper reports a qualitative study that focuses on the researcher's role during development work with teachers. Overall, this is an ethnographic study that is aimed at understanding the teachers' learning culture and the ways in which it may be developed. I have examined my own role as a researcher to address the study's primary research question. This approach required an interrogation of the researcher's role.

Considering my role as a case study or a self-study, I determined that the situation corresponded to what Stake [38] described as an intrinsic case study; that is, the case itself was of primary interest, and I needed to learn more about the particular case in point, namely the researcher's role. Yin [39] emphasized that a case study is an empirical inquiry that investigates by addressing the "how" and "why" questions concerning the phenomenon of interest. Data collection in case studies and self-studies is often extensive and draws on multiple sources to from a comprehensive picture of the topic at hand [40].

4.1 Data collection

The data collection process in this study took the form of participation in 15 planning meetings and 15 reflection talks, 2 group interviews with the teacher teams (at the project's culmination), and the completion of 40 individual reflection notes by the teachers. Throughout the study, I wrote a research log focusing on my role as researcher. I also had several informal conversations with the teachers, and relevant material concerning the researcher's role from those conversations has been included in the research log.

In this study, I have work with and collaborated with two teacher teams consisting of five teachers on each team, a total of 10 teachers. Among the participants in the study, there were two men and eight women. The one with longest experience as a teacher had worked as a teacher for 35 years and the one with the least experience had worked as a teacher for two years. **Table 1** shows an overview of the participants in the study. Many of the participants had previous experience with professional development work and projects in school, while some had little experience related to such work. The table also shows how many planning- and reflection conversations the participants participated in during the study.

Participation in planning and reflection meetings gave me valuable insight into what the teachers discussed and how they discussed it. This allowed me to formulate further thoughts about how I, in my capacity as researcher, could both support and challenge them in their efforts to establish and maintain an expansive transformation process [24]. The interviews gave me the opportunity to question the participants

Participant	Years as a teacher	Participation in planning and reflection talks
Man	8 years	15
Woman	18 years	15
Woman	27 years	13
Woman	2 years	13
Woman	35 years	14
Woman	15 years	11
Man	9 years	15
Woman	16 years	13
Woman	33 years	14
Woman	13 years	12

Table 1.
Overview of the participants in the study.

specifically about their perception of the researcher's role and the importance of collaborating with a researcher. I adopted a semi-structured format for the interviews [41, 42], and conducted them as an academic conversation where the researcher's role had a central focus. The objective of the interviews was to gain access to the participants' perspectives on the researcher's role and the importance of cooperating with a researcher in developing their knowledge and learning. I also wished to capture critical perspectives on how the researcher's role could have been improved and adjusted in this project. These perspectives laid the foundation for developing questions and topics for the interviews.

From the teachers' individual reflection notes, I gained insight into their personal thoughts about collaborating with a researcher and the influence it had on their learning and development. The research log became a tool for understanding my own role and permitted me to adopt a meta-perspective on the research process and on my role as a researcher. Since the study is a study of my role as a researcher, the researcher log is an important data source in this study.

All meetings and interviews were audio-recorded, and I personally transcribed the interviews verbatim. Parts of the meetings containing material pertaining to the researcher's role were also transcribed. The study thus generated large amounts of data from multiple sources, as was necessary to assemble as much information as possible about the researcher's role.

4.2 Data analysis

In addition to exploring and understanding the researcher's role, it was my goal that the project should contribute to developing the teachers' practice. It was therefore necessary to analyze the data continuously throughout the collection process. This gave me the opportunity to form an overview of the project in its entirety and to monitor my own role to ascertain where and how I could support and challenge the teachers in subsequent development work. It was also important to capture the participants' own interpretations and opinions about the researcher's role in the project (the emic perspective) [42, 43], as these perspectives had the potential to inform and enrich my own interpretation. To this end, I also collected the teachers' individual reflection notes throughout the project. This allowed me to form a more holistic perspective on the researcher's role and informed me in designing approaches for sustaining the project's learning and development direction.

To develop a structure for the material, I used the open coding phase described by Strauss and Corbin [44] in the constant comparative method of analysis. In the open coding phase, the data are studied and compared, and categorized according to specific terms [45]. The analytical work commenced with the transcribing of the recordings from the planning meetings and reflection talks. This process gave me an overview of how the teachers were addressing the challenges facing them. Furthermore, I gained some insight into how the teachers were collaborating, what they were discussing, and, not least, how they discussed. To capture a holistic view of the researcher's role, my logbook entries and the teachers' reflection notes were important sources. In moving back and forth between these three data sources, which became the most salient sources in the course of the study, I laid the groundwork for how I, as a researcher, perceived the challenges facing us and how we could work with them. The interviews were also useful in evaluating the researcher's role, but because their value came to light at the project's culmination, they served as secondary sources.

During the process of coding and categorizing the data, some challenges arose in relation to the researcher's role, which have been grouped into the following categories: (1) creating deliberative processes; (2) creating justifications and arguments for actions; and (3) creating exploratory dialogs in cooperation with the teachers. To ensure the quality of the data used, I applied "member-checking" as described by Lincoln and Guba [46], where I continuously analyzed the collected data and presented them to the participants to check whether they matched their experiences and perceptions. These member-checks also helped to ensure the quality of the study. Participation was based on informed consent, and the article complies with the ethical principle of participant anonymity [47]. Consequently, none of the teachers is named.

5. Findings

Within the overall frame of the main research question, the three challenge categories mentioned above are used to structure the presentation of the findings related to the researcher's role. I will present those findings in the current section and elucidate them in the analysis and discussion section. Quotations from my research log and statements from teachers are numbered, and I refer back to them in the analysis and discussion section.

5.1 Challenge 1: creating deliberative processes

LS as a framework is time-consuming for teachers. If teachers are to work thoroughly in accordance with the various LS processes, it is important that the school management devote sufficient time to the work. In this study, the school management adapted well and planned for the teachers to have the time that they needed. As a result, the first challenge that arose was, unexpectedly, a challenge for me rather than for the teachers. At the end of the first LS cycle, the teachers informed me that the time allowed for preparation, for analyzing the challenge, and for planning the research lesson was too much and that they would probably be able to complete it in half the time. In sifting through the data, I found that the teachers had not sufficiently highlighted the challenges from various perspectives. Factors related to the challenge—such as what the challenge consists of, when and for whom it is a challenge, what the current situation is, and what the desired outcome is—were not discussed thoroughly. This finding forced me to reflect on how the development work might best be taken forward, and in my research log, I wrote:

> *I had thought that the teachers had sufficient knowledge of analyzing and exploring their own practices. When my observations and analyses reveal something to contradict this, I question the effects of LS, one of the main tasks of which is to explore, reflect on, and analyze the challenges of one's own practice thoroughly. When teachers lack this competence, it is here that we must begin. This competence needs to be strengthened. (Research log, 1)*

I was fully aware that I had identified something that I felt was lacking in the teachers' practices and that I had touched on an important part of their work. Prior to the study, I had visited the school several times to plan the project and to become acquainted with and establish a relationship of trust with the teachers. Therefore, it

was important for me to consider carefully how to convey to them what had emerged from the preliminary analysis. I wrote in my log:

> *I know that in order to drive development I have to challenge the teachers on what I perceived as weaknesses in their practice. At the same time, I am afraid to break down the mutual trust we have gained … If I had been one of the teachers, I would also want to hear about what was positive. (Research log, 2)*

In this quote from my log, it is clear that there were tensions to resolve with respect to how the findings should be presented to the participants. In reflecting on this, I used myself as an example, as I attempted to gain insight into the participants' point of view: How would I have reacted to being told this?

In a group interview in the middle of the study, I asked the teachers how they perceived the way I, as a researcher, presented the preliminary findings. These were the responses from two of the teachers:

1. You give us a lot of praise and express the positive aspects of what we are doing well, but you also ask critical questions. I feel you are concerned about everything we do, not just what we can be improved, and it builds trust …

2. … and by starting with the good points, we can handle the critical inputs more constructively, and your honesty in your feedback builds trust. (Group interview, 1)

When we discussed why the planning phase lacked the thoroughness that is essential for fully addressing the challenges, the teachers felt that there were various reasons. Two of them had this to say:

1. Maybe it's too much for us at the same time, both thorough analyses of challenges and thinking in a new way or creating something new … both are unfamiliar to us.

2. We are more comfortable using methods and activities of which we have experience, and we may need more knowledge or skills to plan in this new way. (Meeting, 1)

The teachers were honest and open in this discussion which laid a foundation for deeper and more thorough planning that we could develop and strengthen in cooperation. To sustain this mutual trust, it was important that I maintain awareness of the approaches that could help strengthen the planning process. The comment reported above, that two new things at the same time could be too much, also provided an opportunity to reflect on how to take the process forward:

> *I must be aware that we have to think and do things gradually, and that development and change takes time and cannot be expected to occur within a short period of time. (Research log, 3)*

As researcher, it challenged me both emotionally and cognitively to point out deficiencies in the ways in which the teachers had analyzed the challenges: emotionally, because I had addressed and pointed out weaknesses in their practice and, cognitively, because these are demanding processes to go through and I (we) had to

find approaches that could create meaningful and evolving dialogs. While this was demanding and difficult for the teachers, they also expressed the view that an analytic and exploratory approach to the challenges laid a foundation for learning and development. As one teacher stated in a planning meeting:

> *We have never worked in this way with challenges before. Challenges have previously been discussed there and then in a simple way without us having gained a better understanding of them or solved them. However, to really get into them and work with them has been very meaningful and has clarified for me that parts of my practice must be changed. (Meeting, 2).*

This statement indicates that, prior to the study, the teachers had lacked experience in applying thorough analysis and exploratory conversations to challenges that they faced.

5.2 Challenge 2: creating justifications and arguments for action

This category of challenge was probably not experienced by the teachers themselves as a difficulty that they encountered in their practice. It is a challenge that I identified, but, in my opinion, it represents a crucial element in teachers' learning. Although the teachers had begun to develop a more thorough analytical process, I observed a lack of justification and argumentation for actions in their teaching. In planning meetings and planning documents, there was little justification of practice, and it was clear from observing their teaching that the specific teaching activities related to the challenges were inadequate in addressing the complexities involved. Here, they largely discussed what actions they should choose, with less focus on why and how these specific actions would support the students' learning. This was particularly challenging for me, since it appeared that I had identified a weakness in the teachers' approach to their students. This approach lies at the core teaching, and it was inevitable that they must be challenged further on this point. At the same time, however, I was unsure how they perceived my reflections, and consequently I undertook several rounds of thinking and reflection before I presented my feedback to them. In my research log, I wrote:

> *I know that, from my point of view, I am touching a core function when it comes to the practice of the teaching profession, but do the teachers feel the same? However, I must be honest with both the participants and myself so I must address this somehow. How should I present it? How will the teachers react? What have the teachers done before, and what knowledge do they have that can be built on? Which approaches are most likely to be beneficial and meaningful to the teachers in the process of developing justification? (Research log, 4)*

During my reflection process, I was constantly aware of the need to avoid presenting what I perceived as a lack in the teachers' practice as mistakes or weaknesses in their thinking and teaching. I focused, therefore, on determining and building a constructive approach to the development of justifications by asking questions, supporting the teachers, and cooperating with them.

Although the teachers found it tough to have their practice scrutinized, they were also clear that they valued my honesty and that I pointed out potential issues. As one of them stated in an interview:

> *We are so accustomed to our culture and ways of doing things that we do not see what we can do differently. Therefore, it is necessary that someone should come from outside who can see things with new perspectives and who is interested in working together with us. (Group interview, 2)*

5.3 Challenge 3: creating exploratory dialogs in cooperation with the teachers

The following statement appeared in one of the interviews midway through the study:

> *Pedagogical discussions and meetings are important to us, but they rarely have a clear agenda or goal. We meet and talk about what we need there and then, occasionally as a debrief, occasionally as planning. We generally share ideas, support each other, and are not critical of others' ideas. The problem is that we tend to lose focus and start talking about other things. (Group interview, 3)*

As somebody who taught for many years this statement did not surprise me. In this regard, another finding from this category—one that emerged during informal one-to-one dialogs with participants, is particularly interesting. During these conversations, the teachers asked more questions and shared thoughts, ideas, and new perspectives that had not arisen during planning meetings or in reflection talks between teachers.

Compared with the two previous challenges, this challenge was easier to handle. In this case, the challenge did not derive from any lack or weakness in the participants' knowledge; rather, knowledge and thoughts had emerged in one context that had remained unspoken in another context. In my research log, I wrote:

> *It is clear that teachers have knowledge and perspectives that do not emerge in teacher conversations. Could there be anything in the school's culture that compromises the trust between teachers? Is it a culture that simply prioritizes a nice time at work and agreement on most issues? Are teachers afraid to voice their opinions to other teachers? What has created this culture? (Research log, 5)*

The research log was my tool for reflection, wherein I could outline several possible reasons for the phenomenon and devise possible solutions. This time, however, I wished to push the teachers further to identify their own reasons and solutions, because I perceived this as a positive finding and felt encouraged to challenge them more. After presenting my findings, I asked the teachers, "Why do different knowledge and different perspectives emerge in conversations with me but not in talks between teachers?" In discussion, the teachers pointed to several factors:

1. In conversations with you [the researcher], I can say what I want and I can discuss the topic without anxiety about how others look at me. I trust you.

2. When you [the researcher] are here, we become more serious and we take the work more seriously, and you are honest with feedback and asking curious questions.

3. We have a good social environment and trust each other socially, but maybe we do not experience the same security or trust and confidence when discussing pedagogical and professional issues. (Meeting, 3)

These statements from the teachers were valuable to me as a researcher, and they became important for our subsequent collaboration. None of them mentioned that they lacked the knowledge necessary to enter into pedagogical discussions. The issues they raised concerned perceived lack of security and trust, lack of confidence, and a desire for colleagues to ask questions and be honest. In the research log, I wrote:

> *I have visited the school often and invested a lot of time in building trust and openness. I made a conscious effort to praise what should be praised and, although it has been challenging, I have the courage to challenge the teachers where necessary ... One does not engage in challenging dialogs if there is no trust present. A sense of security is necessary to negotiate the unknown. (Research log, 6)*

6. Analysis and discussion

This study shows that cooperative research and development work between researchers and teachers is challenging and demanding but that also offer opportunities for both parties to learn and develop. The study's focus has been on how the researcher can act and react to challenges and opportunities that emerge during teaching practice development, while still allowing teachers to own and manage the project. Below, I discuss four factors that emerged as important across all categories presented in the findings section.

6.1 Creating and maintaining trust

Discussions and reflections concerning trust between the researcher and teachers arose in several contexts during the study. Although I was conscious of the need to establish relationships of trust in advance of and during the study, reflections, questions, and challenges related to trust recurred throughout the study, both for myself as a researcher and for the participants. The concept of trust and confidence was also identified by Stenhouse [48] as a possible barrier to teachers' professional development and learning. The findings from this study indicate that it is challenging for the researcher to determine a suitable approach to creating relationships of trust and that this requires the researcher to be able to reflect on his or her own role through reflexive processes [15, 27, 28]. In an effort to create and maintain trust and open relationships among the participants and between the participants and myself, the study's findings clearly attest to the tensions and contradictions associated with these processes [24]. With regard to both developing the teachers' practices and developing and understanding my role as a researcher, it was crucial to actively engage with these tensions and establish from where they derive, describe what they are about, and to take stock of my own values and how I sensitively treated them. These processes comprise what Steen-Olsen [15] describe as the researcher's epistemological reflexivity. The tensions that arose in the study, related to trust, thorough dialog and justifications for action, became valuable contributors to change and knowledge building during the process of negotiating these tensions [24].

Based on my reflections in the research log (see Research log, 1) and statements from the participants (see Group interview, 1) it appears that trust and honesty between researcher and participants are important for both parties, and both parties must work to establish and maintain them throughout the project. Participants clearly indicated that the researcher's ability to provide positive feedback and to

identify and highlight the positive aspects of their practice helped to established trust (see Group interview, 1). They also pointed to the importance of the researcher expressing interest in their practice generally and not just in the areas requiring improvement Takahashi [22]. My curiosity regarding several areas of each teacher's practice was valuable, therefore, in that it offered a better opportunity to modify the teacher's existing approaches and to find ways of negotiating challenges that were in line with his or her level of development. We were thus able to collaboratively devise approaches to challenges that helped to expand the teacher's individual development zone, as described by Vygotsky [31], and also to create meaningful collective processes [32]. My reflections between Meeting 1 and Meeting 2 indicate that the researcher plays a significant role in creating meaningful collective processes that generate what Engeström [33] describes as expansive transformational processes or expansive learning, which are major functions of the researcher's role within the CHAT framework [24]. This finding also attests the importance of the researcher's methodological reflexivity [15].

If projects executed within the LS framework are to drive change and development in practice, teachers must be able to engage in deliberative processes and adopt a critical view of their own practices [20, 49]. During the first half of the study, dialogs between the teachers demonstrated that these qualities were lacking. I was confident that this was due to a lack of knowledge and experience as to how such processes should work.

6.2 Presenting findings to the participants

According to Schön [50], it is by discovering weaknesses and deficiencies in the ways in which we do things that we create opportunities for learning and development. When I identified weaknesses in a teacher's approach to a challenge, two particular factors emerged as important. First, the findings had to be presented in a way that created meaning and understanding among the teachers but that also demonstrated how they might have gained more insight into the challenge by adopting an improved approach Takahashi [22]. In my log (Research log, 4), I reflected on the weaknesses that I discovered with respect to justifications and argumentation for teachers' actions. The most demanding aspect of this was not identifying the shortcomings but finding a good approach to present them so that they might benefit the participants. This demonstrates how tensions can arise in the activity system, in the meeting between challenges and how to respond to them [24]. While attempting to predict how the teachers might react, I was also obliged to reflect thoroughly on what the next step in the development process might be. The extract from my research log describes some of this reflexive process, and demonstrates that the researcher must reflect on and address various challenges simultaneously. Second, it was important that I signal my interest in learning more about the challenge, in creating development, and in improving collaboration with the teachers. The participants appreciated the fact that I adopted this approach when communicating my findings (see Group interview, 2). Their stated responses verify that they trusted me and welcomed my support, which underlines the importance of the researcher having the courage to challenge the teachers by questioning their existing practices.

Another important point that emerged from the stated responses is how important it is to the participants that the researcher not only points out shortcomings but also plays an active part in the developmental process. Fernandez [36] also emphasizes the importance of the researcher's ability and willingness to contribute to learning and

development. Takahashi [22] is clear that an important part of the researcher's role is to support teachers by asking questions and challenging them with critical thinking and new perspectives. To ensure that my questions and critical input were meaningful for the teachers, I had to ascertain how the teachers were thinking and acting in relation to the challenges they faced. To develop their thinking and practice, I had to assess their current levels of knowledge and awareness; that is, I had to determine their *actual development level* [31]. If the researcher or the *knowledgeable other* is to be able to communicate effectively with the teachers, they must know the teachers and adjust the content and progression of development in accordance with their level of knowledge Takahashi [22]. The teachers' stated responses (see Group interview, 2) highlight the importance of the external perspective offered by the researcher who can perceive aspects of a teacher's practice that are difficult to detect from the inside. A study by Somekh [51] attests that teachers find it difficult to objectively perceive the culture they are immersed in, which also makes it challenging for them to identify where and how changes might be made.

6.3 Enabling thorough discussions and exploratory dialogs between teachers

While the teachers in this study acknowledge the importance of pedagogical discussion and professional meetings, they also found that the meetings lacked structure and failed to focus on the topic at hand. My experiences of meetings and dialogs between the teachers corroborated this. I also observed that dialogs between the teachers seemed to be cumulative in their effect [52], in that participants largely confirmed what others had said, building on it in positive but uncritical ways.

My initial thought was that a way to carry out planning meetings and reflection talks that moved beyond the cumulative level should be identified. Jung and Brady [37] emphasize the importance of the researcher's ability to instigate discussions and reflections, but do not offer suggestions as to how the researcher might support and develop the discussions. However, during informal one-to-one conversations, it was clear that several participants were in fact already capable of moving beyond the cumulative level, but between researcher and teacher, informal dialogs were more exploratory [52]. According to Lewis et al. [20], thorough discussions and reflections are important for continuing the LS process and they have a significant impact on teachers' learning and development. In research log 1, I reflected on the lack of thorough exploratory discussions between the teachers, and initially concluded that their competence in that area needed to be strengthened using a theoretically focused approach. However, through informal conversations between the teachers and myself it became apparent that the teachers already had the required knowledge and competence and that the lack of thorough exploratory discussions was due to other factors. The theoretical approach I had been considering was therefore inappropriate and would have been insufficient to meet the needs of the teachers at that time. This is supported by Postholm and Skrøvset [34] who point out that if theory and theoretical perspectives are not introduced at the appropriate time, they may in fact be counterproductive. In this case, the fostering of thorough discussion and reflection became a practical challenge.

Kemmis [53] use the term "praxis" (p. 465), which in this context is understood as a dialectical process in which teachers can change teaching and teaching can change teachers, emphasizing that praxis includes "sayings, doings and relatings", with a focus on how an educator might act wisely. These human activities are in turn formed by historical and cultural conditions. In this context, "sayings" are understood as

the content of the dialogs and reflections, and an important task was to focus on penetrating further into the content as basis for a broader understanding of the challenges facing the teachers. This in turn may lead to improved teaching practices: that is, teachers' "doings". Rather than adopting a theoretical approach, we had to approach the challenge practically and consider how we might practically strengthen the dialogs and reflections so that they might become more deliberative and critical. By adopting a historical and cultural analytic perspective on the dialogs between the participants in the study, which is fundamental to CHAT, we could cooperatively devise a new way of structuring the dialogs, which in turn helped to generate new content in various aspects of the activity system [24].

These considerations bring us back to the question of trust, this time to the professional trust between teachers (Meeting, 3). It became clear that there was an issue of weak professional trust between them (Meeting, 3), as well as the difficulties presented by the unfamiliar approach and their lack of experience. This is supported by Postholm and Skrøvset [34], who emphasize the importance of the researcher's awareness of the relationships and trust levels between the teachers which have two dimensions: social and academic/professional. The participants in this study had a good social environment and high levels of social trust in one another, but that degree of trust was absent from their pedagogical and professional discussions. Rather than building theoretical competence, we therefore had to begin by building professional trust.

To this end, it was necessary to adopt an approach that allowed the teachers to test their perceptions and understanding of challenges within an environment of mutual trust. It proved helpful in this regard to refer to Schön's [50] conception of *reflective practice.* We began with a thorough analysis of the challenge, designing elucidatory questions such as the following: When is it a challenge, and to whom? What does it consist of? What experiences can we relate to it? What factors could sustain it? What is the current situation? What is the desired outcome? In this process, we devised the questions together, but it was up to the teachers to delve into them in greater detail and to bring forward different perspectives and interpretations. The teachers thus had significant involvement in designing the approach and adapting it to the subsequent process. This allowed them to address the challenges in a more reflective way and created what Eraut [54] describes as deliberative processes. In turn, meaningful deliberative processes between the teachers laid the foundation for expansive learning and enhancement of their individual development zones [24].

It was difficult to strike a balance between supporting the teachers and challenging them. To strike this balance, it was necessary for me to become well acquainted with the participants and to spend sufficient time with them in their field of practice. I visited the research school often, and participated in discussions, dialogs, observations, and informal meetings. Language thus became an important mediating artifact [31] for creating meaning and common understanding between us. This formed a good basis for striking the necessary balance and for facilitating subsequent processes in the project.

6.4 The researcher's practical wisdom and pedagogical/professional discretion

In pursuit of the balance between supporting and challenging teachers, another aspect, which was present in all the challenge categories mentioned above, affected me as a researcher. Several studies have focused on teachers' practical wisdom and pedagogical discretion [54, 55]. However, in respect of formative intervention

research [24] and the researcher's role, this theme has received little attention. Although I gleaned a lot of information about the balance from the data I collected, many of my actions and approaches were based on practical wisdom and pedagogical discretion rather than on the data alone. As a researcher and initiator, I was also conscious of my responsibility to lead the project in a direction that would encourage learning and development, although the project was largely teacher-led. With this responsibility come certain expectations, from both the researcher and from the teachers, and it was necessary for me to make some decisions based partly on past experience, partly on theoretical considerations, and partly on practical wisdom and pedagogical discretion. Within the CHAT paradigm, tensions and contradictions are acknowledged as playing an important role as a starting point for development [24] but, from a researcher's perspective, one can never predict what new tensions and contradictions will emerge after those already detected have resolved. I was therefore obliged to make decisions continually.

7. Conclusion

Although LS is a method that is largely teacher-led, the findings of this study attest the need for researchers / external interveners to support and strengthen LS development work in a direction that promotes learning. This study corroborates findings from previous research, concerning the importance of the researcher's abilities to communicate, to redefine his or her own role, to collaborate with the participants in ways that facilitate learning for all parties, and to encourage new ways of thinking about teaching and learning.

The present study indicates that it is unrealistic to simply, implement LS as a mediating artifact for teachers' learning and development and to expect expansive learning to occur as an automatic result. By examining the researcher's role in research within LS, this study both clarifies that role and highlights the challenges the researcher is likely to encounter within LS. LS entails processes that are demanding and comprehensive for teachers, and it requires them to have the necessary skills and knowledge to exercise thorough analysis and reflection. Unlike several of the research projects mentioned above, which indicate the importance of the researcher's role, this study not only highlights the challenges that emerged, but also describes how the researcher reacts and responds to these challenges. The researcher's thoughts and actions related to these challenges have received relatively little exploration. This study will provide the research field and researchers with useful information concerning how the researcher might act and react, and will therefore be an important contribution to researchers' development of useful and necessary competence, as advocated by Nilsson and Postholm [12]. The study clarifies that the researcher's role in practically oriented research is a challenging one that requires competence in several areas. Notably, this applies to the type of research that the expert group for teachers' roles (2016) called for, in which the goal is to contribute to teachers' learning and development and to encourage changes in teaching practices. This study also verifies that the researcher's role and approach are of crucial importance for change and development, and that the reflexive researcher intervenes in such a way that an approach that is at once challenging and supportive helps to reduce the complexity of teachers' professional development, as described by Opfer and Pedder [4]. Further research on the researcher's role in LS and in similar research projects is, therefore, recommended.

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