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To cite this article: May Britt Postholm (2020) The complementarity of formative intervention research, action research and action learning, Educational Research, 62:3, 324-339, DOI: [10.1080/00131881.2020.1793684](https://doi.org/10.1080/00131881.2020.1793684)

To link to this article: <https://doi.org/10.1080/00131881.2020.1793684>



Published online: 23 Jul 2020.



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# The complementarity of formative intervention research, action research and action learning

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## ABSTRACT

**Background:** This article focuses on the complementarity between formative interventions research conducted within the framework of cultural historical activity theory, action research and learning, as well as how this complementarity influences the researcher's role.

**Purpose:** The study suggests how action research, learning and formative interventions can be complementary in educational research and, furthermore, how this complementarity can challenge and expand the researcher's role when supporting and researching school development processes.

**Sources of evidence:** A previously conducted study is presented as an example. The analysis of the researcher's role is based on observations, interviews, reflection conversations and questionnaires focusing on the arenas in which the researcher acted.

**Main argument:** The paper argues that the researcher's role in educational research should be expanded, combining the researcher's role both in action research and in formative interventions. The example study shows that researchers must engage with teachers in their teaching and support them in their daily practice, thus helping them to apply new knowledge to practical situations in order to develop their practice.

**Conclusions:** Complementarity between action research, action learning and formative interventions aligns the processes at the classroom and system levels, leading to school development.

## ARTICLE HISTORY

Received 5 January 2020

Accepted 6 July 2020

## KEYWORDS

Cultural historical activity theory (CHAT); formative interventions; development work research (DWR); action research; action learning; whole school development

## Introduction

The focus of this article is on the complementarity between formative intervention research conducted within the framework of *cultural historical activity theory* (CHAT), and action research, and learning, as well as how this complementarity influences the researcher's role. Researchers are often asked about the distinguishing features of various forms of action research on the one hand and *development work research* (DWR) (Engeström 2007) on the other. DWR is a formative intervention methodology specifically conducted with the framework of CHAT. Research within CHAT takes culture and history into consideration, and the aim is *concept-formation* (Engeström and Sannino 2010). Concept-formation means that researchers and practitioners form collective concepts, becoming a collective object, or sharing a collective goal – thereby functioning as a driving force for development. Whereas action research might involve only one, or

a few, practitioners in a setting (for instance, a group of teachers in a school engaged in learning within an action research project), research according to CHAT conceptualises people as systems within a system of social relations. According to Virkkunen and Newnham (2013), action research contributes to the gradual development of a practice connected to a visible problem or seeks to realise a predefined objective, while CHAT forms the basis for development towards a future collective object that is constructed according to historical and contemporary analyses of a practice. A collective object for a whole school gives direction for the actions conducted by individual people or groups of people as a teacher team. This means that focused sub-questions, derived from an overall development question for the whole school, frame the activity in classrooms. Developments in classrooms are, thus, aligned with the school's development goals or objectives.

Within this framework, the researcher can play a crucial enabling role in the development process. As Engeström and Sannino (2010, 15) state: 'In formative interventions, the researcher aims at provoking and sustaining an expansive transformation process led and owned by the practitioners'. Following Polanyi (1967), we should recognise how difficult it can be for teachers to describe their daily practice explicitly, since their knowledge is often tacit. Teachers may be bound to their 'horizons of observation' (Hutchins 1996), suggesting that they are sometimes constrained by what they already know and do in their teaching. In this situation, it may be beneficial to use outside resources to support and enable teachers to expand their perspectives. Accordingly, the researcher's role in formative interventions is to analyse and plan the development of practice together with practitioners.

Vygotsky (1978) introduced two concepts: the *actual developmental zone* and the *zone of proximal development*. The actual developmental zone defines what a person can do and think of alone. The zone of proximal development is the difference between what a person can do alone and what this person can do with some help from more competent others. In action research, a researcher can help a teacher or a group of teachers to develop their practice (Cochran-Smith and Lytle 2009; Kemmis and McTaggart 2005; McNiff 2013; Zeichner 2001). Huzzard, Ahlberg, and Ekman (2010) describe the action researcher as an active constructor of the discourse shaping the collaboration. Engeström (1987, 174) adapted Vygotsky's individual-oriented concept, the zone of proximal development, to collective activities, asserting: 'It is the distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated'. This means that both the activity and the culture in the society in question are developed and changed. In schools, the intention is, therefore, that all teachers and leaders collectively develop a shared object, a joint overall goal, and act on it.

This article describes how I worked in the role of researcher with teachers in a lower secondary school in Norway (approximate pupil ages 13–16) who wanted to develop their own practice. I commenced the study by using CHAT as the theoretical framework. However, my reflections on the researcher's role that were connected to the arenas in which I acted, and how I acted after the conclusion of the project, made me aware that I had expanded the researcher's role within the chosen framework. Essentially, it seemed that I had expanded the researcher's role as described in formative interventions, and combined the researcher's role as defined in both action research and CHAT.

The problem formulation I aim to pursue in this article is the following: How can action research, action learning and formative interventions comprise elements of the same study? The paper argues that action research, action learning and formative interventions can be complementary in educational research and, furthermore, how this complementarity can challenge and expand the researcher's role when supporting and researching development processes. In presenting this argument, I draw on evidence from the above-mentioned project, contextualised within research on teachers' professional development. Thus, the paper represents contextualised knowledge – not in any way intended to suggest a universal solution. However, it is hoped that the paper can function as a cognitive tool for other researchers, and therefore be of use in other, similar research settings.

Action research is usually associated with action learning; action learning is connected to practitioners and action research is connected to researchers (Pedler and Burgoyne 2009). In the following background section, I initially describe action research, action learning and formative interventions, before presenting research on teachers' professional development. Then, the example project and main argument are presented. A description of the project, and a presentation and analysis of the researcher's role within formative interventions and action research are provided. I end the article with some concluding reflections.

## Background

### *Action research and action learning*

A full conceptual exploration of action research and action learning is, of course, beyond the scope of this paper; however, it is important to introduce the concepts here and explain how they will be used in the context of this article. Action research has developed in many directions. It may be emancipatory, participatory, critical and creative, and support a strategy for improving teachers' practice. I emphasise the latter focus, but first give a broad indication of the origins and development of action research, before going into greater depth. In the US in the 1940s and 1950s, on the basis of Kurt Lewin's work, researchers sought to understand and reduce the gap between research-based knowledge and practice in schools. Although interest in action research subsequently declined somewhat in the US until the emergence of a new tradition in the 1980s (Zeichner 2001), the 1960s and 1970s saw the development of the 'teacher as researcher' approach in the UK and elsewhere (Stenhouse 2011). In Australia, some research in the 1970s was inspired by the school-based developments in Great Britain, with an emphasis on teachers' development of their teaching practice and an overarching aim to promote equality and justice in schools and society (Kemmis and Grundy 1997). The concept of 'action research' involves teachers connecting research to their own practice. In the 1960s and 1970s, several research projects were initiated with the goal of developing teachers' teaching practice in schools (Zeichner 2001). When development work is conducted in collaboration with researchers, we approach the best-known understanding of action research. In this process, researchers collaborate with teachers to develop teaching practice, employing the teachers' needs and their ability to reflect as a starting point, instead of focusing on standards.

In Australia, action research developed in its own direction, with a strong relationship to critical theory that emphasised the teachers' development of teaching, their engagement and the idea that their voices should be heard. This form of action research is termed *participatory action research* (Kemmis and McTaggart 2005), because researchers and teachers collaborate to develop the teachers' practice and position in schools, with the teachers' perceived needs as the starting point. It is also sometimes referred to as *emancipatory action research* (Zeichner 2001). I was guided by participatory action research when I worked with the teachers and conducted action research on their action learning processes. When I use the term 'action research' later in the text, I refer specifically to participatory action research. This direction also corresponds well with the views of formative intervention research, since both approaches emphasise the practitioners' needs.

Originating with Reginald Revans (Revans 1982), the concept and application of action learning have a long history and is often described as combining self-development with action for change (Pedler and Burgoyne 2009). It may be the individual teacher who learns, but it can also be people who learn together (Ashton 2006). This means that action research and action learning can take place when a researcher collaborates with an individual teacher in developing his or her practice or when a researcher collaborates with several teachers. Action learning is often used as a method for teachers' learning (Postholm 2018), but the distinction between action research and action learning does not necessarily depend on who is conducting the research; instead, it relies more on how the action is conducted. To be defined as action research, the question and starting point for the actions to be carried out must be based on earlier research, the data collection connected to the actions being considered; analyses of the collected material must be systematic and the researcher must be responsible for publishing the work (Postholm and Smith 2017). In action research, the teachers are not conceptualised as systems within systems, as they are in CHAT, and action learning circles tend to be actions that are not necessarily connected to the activity of the whole organisation (i.e. the school).

### *Formative interventions and expansive learning*

According to Engeström (2007), formative interventions need to be understood as formations of critical design agency among researchers, teachers and students. What is initially presented as a problem or a task is interpreted and turned into a meaningful challenge during the intervention (Engeström 2007, 370). During a ten- to twelve-week period, practitioners, together with the interventionist researcher (as the researcher is named within CHAT), collaborate to develop practice in what is named a 'Change laboratory' (Engeström 2007; Engeström et al. 1996; Virkkunen and Newnham 2013). The intention is to develop a new model of such collective practice.

The view in CHAT is that contradictions within and between activity systems are the starting point for change and development in formative interventions (Engeström and Sannino 2010). The starting point for development can, thus, be that teachers in a school face a problematic and contradictory object, or overall goal, that they analyse and expand by constructing a novel concept – the contents of which are not known ahead of time to the researchers. There is, in this way, a contradiction between the acting subject and the object. During the process of development, the

contents and course of the intervention are, furthermore, subject to negotiation, and the shape of the intervention is up to the subjects. *Double stimulation* as the core mechanism implies that the subjects gain agency and take charge of the process (Edwards 2009; Sannino 2015). The outcome and the aim of formative interventions is to generate new concepts that may be used in other settings as frames for the design of locally appropriate, new solutions, and the key outcome of formative interventions is agency among the participants. The researcher's role is to provoke and sustain an expansive transformation process which is led and owned by the practitioners (Engeström and Sannino 2010, 15). The expansive transformation process leads to *expansive learning*.

The idea of expansive learning is built on the distinction between action and activity. Expansive learning is movement from actions to activity. As Engeström (1987, 125) writes,

The essence of [expansive] learning activity is production of objectively, societally new activity structures (including new objects, instruments, etc.) out of actions manifesting the inner contradictions of the preceding form of the activity in question. [Expansive] learning activity is mastery of expansion from actions to a new activity.

This means that expansive transformation processes can lead to a new collective practice; for instance, in schools as organisations. The expansive learning cycle contains seven phases.

Preparing the development question and linking it to the object, or the overall goal, is the first step in the learning cycle (1). The next step in the expansive learning cycle is to carry out historical and empirical analyses (2). The teachers may meet together and individually reflect on their teaching practice, and the interventionist researcher can collect *mirror data* (Cole and Engeström 2007), by observing, interviewing and studying documents, and using this data as a mirror for the teachers to help them understand the situation when it comes to their teaching practice. The work in the change laboratory typically starts with the mirroring of problems in practice. The researcher can also interview teachers who have been in the school for a long time to conduct historical analyses. When new content has been introduced in the activity system (3), the new model (4) can be analysed for possible outcomes. Teachers can then test planned teaching in practice, with the development question as the framework, implemented in single classes or sessions in classes. These classes may represent small, innovative learning circles. Together, these testing lessons might constitute a new collective practice of varied ways of working within the framework of the object and the development question. Innovative circles, which this testing of teaching represents, may also be left as single events without becoming expansive, while other small innovative learning circles may present new solutions that thereafter will be implemented and put into practice (5) (Engeström and Sannino 2010).

This means, for instance, that teachers create a new collective practice for their teaching, with a collectively created object as the driving force for their activity (Leontév 1981). After the new solution/model has been implemented (5), the teachers reflect together on how this solution/model works in practice (6). If they find that the solution/model works, the tests of teachers will then be merged into a unified programme, which, over time, will be consolidated into practice (7). The stepwise implementation of a new vision or a new model takes about ten to twelve weeks, with one or two

follow-up sessions after a few months (Engeström 2007; Engeström et al. 1996; Virkkunen and Newnham 2013).

According to Engeström (2007), the Change Laboratory is based on separation and embeddedness at the same time. The Change Laboratory is located as close to the concrete practice as possible, but it is 'protected by walls' from the practice (372). The boundaries between the Change Laboratory and the practice can be permeable (allowing movement across them), but it is the practitioners who are encouraged to go out of the Change Laboratory to check reality (Engeström 2007). Engeström (1999) writes that the expansive learning cycle and its embedded actions may be used as a framework for analysing small-scale innovative learning processes. Engeström does not specifically allude to the researcher's role during the embedded actions and how the researcher can support development by, for instance, regularly observing teachers and reflecting on these observations with them. It is in connection with the embedded actions that action research and action learning become relevant perspectives. This I will exemplify later on in the paper, by describing the researcher's role during a specific project in a school. However, before I discuss this project example, I will present research on teachers' professional development.

### *Teachers' professional development in schools*

According to Avalos (2011), teachers' professional development refers to teachers' learning, how teachers learn to learn and how they apply their knowledge in practice to support students' learning. Ambler (2016) found that classrooms and schools provide teachers with opportunities for learning. This is supported by Mohan, Chand, and Lingam (2017), who found that professional development in schools is necessary to change teaching practice. Ambler's (2016) study shows that teachers need to be able to talk, in the sense of putting words to their daily work; in short, they need to work with others during school days to learn from their everyday practice and to develop their own practice. Soini, Pietarinen, and Pyhältö (2016) observe that learning and well-being at work require two elements: teachers must be self-reflective and connected to their own teaching in the classroom and they must be co-regulated for learning. In brief, teachers must work and reflect together. In practice, however, this goal proves to be difficult. Studies show that teachers are often overly generous when reflecting together on each other's practice, rather than challenging each other to enhance learning (City et al. 2010; Junge 2012). Horn et al. (2017) found that teachers rarely accomplished collective interpretations for future work. Vrikki et al. (2017) note that teachers reflected together, but in doing so they focused on concrete cases at the practical level, rather than connecting their practice to the theory or ideas being developed – for instance, in the Change Laboratory. Another study reported that teachers both observed each other and reflected together afterwards and that this activity enhanced the teachers' learning when it came to basic lesson plan elements and steps in classroom activities (Cheng and Wu 2016).

Grau et al. (2017) draw attention to how partnerships between researchers and teachers influenced teachers' reflections on their own practice. The reflections focused on the teachers' practice, and the teachers therefore developed ownership of the research findings as well. Another study shows that collaboration between researchers and teachers can be constrained by a low degree of connection to teaching activities (Olin and

Ingerman 2016). Wood et al. (2017) suggest that the conditions for teacher learning include the collection and analysis of data related to pupils' learning outcomes, the teachers' prior teaching experiences and pivotal interventions by group members and facilitators. The study notes that the researcher played an important role in sustaining the process, while empowering the group to take part in its own decisions. Ermeling and Yarbo (2016) also focused on collaboration between researchers and teachers and found that these collaborations guided the teachers to new insights and judiciously applied pressure to expand the teachers' horizons of instructional possibilities. González, Deal, and Skultety's (2016) study showed that researchers can use a range of moves to sustain a stance of inquiry. For example, when the researchers shared insights based on their own experiences as teachers, the explanation moves seemed to accomplish co-membership between the researchers and the teachers. These moves indicate that the researchers did not take a neutral stance, and the researchers' moves supported teachers' learning and classroom teaching. The study concluded that researchers are important catalysts for promoting teacher learning. Tan and Caleon (2016) found that it is important for researchers to be sensitive to teachers and to be open to emergences in learning when defining the problems to be worked on. Smith and Lindsay (2016) show the importance of teachers articulating their own learning needs and that providers of external support should scrutinise schools' current practice before providing learning opportunities for teachers (e.g. when researchers collect mirror data) (Cole and Engeström 2007). According to Timperley et al. (2007), teachers need new knowledge to reflect on their teaching in alternative ways; therefore, external researchers as collaborative partners can be helpful. The question is how teachers can appropriate new knowledge and use it in their practice. In a school-based development project, the teachers thought that the teacher educators/researchers gave them interesting lectures, but they were not able to transform this knowledge to their teaching practice (Postholm 2018). As one of the teachers at this school observed:

It is one thing to sit and talk about it, but something different to drag it into practice and get counselling right then and there; so, I feel that it was not pulled enough into practice. We got many impulses from teacher educators that I am still striving to include in practice (p. 103).

Studies have found that reflection on concrete practice that is jointly observed can lead to changes and improvements in practice (Camburn 2010; Cheng and Wu 2016; Given et al. 2010; Mohan, Chand, and Lingam 2017; Parise and Spillane 2010; Soini, Pietarinen, and Pyhäntö 2016; Zwart et al. 2009). However, according to Elmore (2000), it is unlikely that observation and reflection connected to concrete practice will lead to changed and improved practice if the school, as an organisation, does not focus on this developmental practice. Elmore (2000) argues that it is the school leaders' task to arrange for the teachers' learning in schools. This means that school leaders also have to be part of the collaboration processes with researchers, so they can learn and manage to lead the development processes after the researchers have withdrawn from the practice field.

### **Complementarity: an example and discussion**

In the section above, I have considered action research, action learning and formative intervention research. In this part of the article, I will explain how these approaches were

used together in a project. This example will be used to suggest that these approaches can be complementary in educational research and, furthermore, how this complementarity can challenge and expand the researcher's role when supporting and researching school development processes. The intention of the example project, which I describe below, was to support the teachers' professional development. Therefore, I have also presented related research on this topic. This research suggests that the school is a good arena for teachers' professional development, but that there is also a need for external researchers as collaborative partners within the school's practice. Thus, this research draws attention to the importance of the researcher's closeness to the teachers' practice and the combination of action research, action learning and formative interventions, as described in the Change Laboratory and CHAT.

### *An example of complementarity*

The project I use as an example was conducted in a lower secondary school in which twelve teachers worked. My role as a researcher was to support the teachers' development and to study the developmental processes. The project could, therefore, be considered developmental work research (Toikka, Engeström, and Norros 1985) within the framework of a formative intervention study, since my role was to provoke and sustain an expansive transformation process which was led and owned by the practitioners (Engeström and Sannino 2010). I refer to it as a formative intervention study. Permission to conduct the study was sought and granted from the Norwegian Ethical Research Committee. Permission to conduct the study was also given by the principal and the teachers at the school, who signed a consent form based on informed consent. The leaders and teachers were informed that their names would be anonymised and that they would be given full confidentiality (NESH 2006). The school and the participants are, therefore, unnamed.

The teachers developed the following developmental question for their work: *How can various work methods, with a focus on learning strategies, contribute to each pupil's subject and social development?* I was present at the school every fourteen days over a period of two years. During these visits, I had meetings with the teachers and researched the developmental work. I used CHAT and the activity system when analysing the situation at the school, both before and after the development work. Furthermore, I employed the expansive learning cycle with its phases as a tool to guide the processes when supporting the development work. In the project, I collected data through observations; interviews with leaders, teachers and pupils; questionnaires given to pupils; and reflection conversations with teachers which were based on observations of concrete teaching situations. The data was transcribed on an on-going basis and analysed. I also made entries in a logbook after each visit to the school, reflecting on the processes. When analysing materials within parts of the activity system, I used the constant comparative analysis method developed by Strauss and Corbin (1998) to structure the transcriptions and make them manageable and reportable. According to this method, as the researcher I continuously asked questions regarding the material and compared the material collected in order to develop an understanding of the processes in practice. The transcriptions and preliminary analyses of the data were also used to aid the development processes by being presented to, and reflected on, with the teachers. The analysis of

my role as a researcher was based on the collected data, focusing on the arenas in which I acted and how I acted.

### *Description of the process intertwined with analyses*

As already mentioned, the intention of action research is gradually to develop parts of a whole practice, whereas formative interventions are oriented to transform a collective practice (Virkkunen and Newnham 2013). The transformation within formative interventions is driven by a collective object or overall aim: in the example project, teachers aim to develop their teaching, with a focus on working methods and learning strategies, to enhance every child's subject and social development. During the ten-to-twelve-week period in the Change Laboratory, the intention was to develop a new model for the collective practice. This means that some factors in the activity system have their content redefined. If various teaching methods and learning strategies are furthered as the collective object, it is also likely that the analyses of the actual activity system will reveal contradictions between the acting subject, the teachers and the artefacts that the actors have at their disposal. In the new activity system, new artefacts are therefore likely to be brought in. Tools and ideas are described as bridging the gap between the present and the envisioned future (Engeström 2007). The next step was a period of five to six weeks of testing the new model, and after the testing period follow-up sessions were conducted (Virkkunen and Newnham 2013).

At this stage, the researcher's participation in formative interventions is about taking part in conversations before and after testing the new model. The researcher's role in CHAT was expanded in that I, the researcher, also participated in the testing period: the phase after a new model is developed and analysed (phase 4). In addition to that, I was a facilitator and challenging partner during the start-up phase in the Change Laboratory period, and I also took part when the teachers observed and reflected together during the testing period, conducting actions to improve their practice (Postholm 2008a, 2008b). The collaboration between myself and the teachers was, thus, connected to teaching and not constrained by a low degree of such connectedness (Olin and Ingerman 2016). According to Timperley et al. (2007) teachers need new knowledge and support from external resource persons. As research also shows, it is not arbitrary how this support is given (Postholm 2018). It is intended to present new knowledge to teachers and provide supportive connections to actual practice to transform their learning into teaching activities. This means that researchers have to be present and sensitive to teachers (Tan and Caleon 2016) and scrutinise current practice before providing learning opportunities for teachers (Smith and Lindsey 2016). Thereafter, a researcher can present relevant knowledge, and the teachers can apply their knowledge in practice. They have not just learned; their learning can also be integrated into their teaching. They develop professionally (Avalos 2011).

Following Postholm and Skrøvset (2013), the researcher gains authority, influence and trust through competence in action research, meaning that the researcher has to understand the processes unfolding in the classroom and give support to the teaching and learning processes. According to González, Deal, and Skultety (2016), co-membership seems to have been accomplished between the researchers and teachers when the researcher shares insights based on her own experiences as a teacher. This means that

it is a great advantage to know the teachers' practice from the inside. Fortunately, I had 14 years of experience as a teacher in a lower secondary school classroom and was familiar with school life.

I referred to the teaching processes in the classroom where the teachers were trying to develop their practice as 'innovative learning circles', which constitute action learning (Revans 1982, 1984). I presented research to the teachers about teachers' professional development and about action learning, in order to help them develop an understanding about the development processes at the beginning of the project. I also wanted to present theories connected to their development question. From my point of view, it seemed that the teachers might benefit from theory about metacognition and learning strategies, and from theories about how to vary the teaching; however, at the beginning of the project, they were engaged in each other's practice and learning from each other. They said at this point of the project that they did not need any theories to help in their reflection processes.

When I met the teachers before the project started in the beginning of the autumn semester that same year, they felt that they wanted to develop their teaching by focusing on working methods and learning strategies during the spring semester. They wanted the researcher to be an external resource to support them during their developmental work, but I felt that I had to maintain a delicate balance between supporting and 'pushing' the teachers. The teachers had found the theme they wanted to focus on, but they did not know what to do in their practice when it came to various teaching methods and learning strategies. They had created a development question together with me, and this question represented the object that would give direction for their practice. I wanted to present the theory for them as a mediating artefact to reflect on their practice, but the teachers were not, as already mentioned, receptive to theory at this early stage. They used the first semester to identify the theme and the development question. Although they had decided among themselves what to focus on, it took three months to make it their own (Postholm 2008a) and to really understand what the purpose of the developmental work was. This is also, according to Timperley et al. (2007), a premise for development: Why should they intervene in their practice and learn from it if they do not understand the purpose? Furthermore, teachers, like other learners, need good reasons to engage with new knowledge so thoroughly that they change their practice.

The teachers used almost the entire first semester to identify the theme, and they used the next semester to develop a collective actual development level, and also to expand Vygotsky's concept (1978) from an individual to a collective level. They wanted to focus on concrete cases at the practical level (Vrikki et al. 2017). At the end of the first semester, they suggested that they wanted to reflect on their teaching in several arenas: in subject teams, in class teams and when all the teachers in the lower secondary school were gathered together. It was in the subject teams that they planned lessons and observed and reflected together, with myself as a collaboration partner; in the other arenas, they shared and reflected on their experiences in the subject teams. For each lesson that should be planned, taught, observed and reflected on, they made planning documents and formulated sub-questions framed by the development questions, such as 'How do I activate the pupils during the lesson?' The study highlights how the teachers needed the second semester to become familiar with their own and others' practice and thus

develop a common development level (Postholm 2008b). The leader of the team said the following after this second semester:

We've learned that we have a high degree of competence, which becomes more visible when we share it with others [...]. We've discovered that when we work together, we become more visibly competent [...]. We've gained more insight into our colleagues and the pupils [...] our action learning will also make the learning better for the pupils. Therefore, we want to continue doing this next year, following the same plan (Postholm 2008b, 1725).

Throughout the course of the second semester, the teachers also developed trust in each other. Each teacher planned one lesson, taught this lesson, had it observed and took part in the reflection process afterwards. Each teacher also observed two other lessons and took part during the reflection sessions afterwards. Additionally, each teacher brought his or her experiences to his or her class team, and the teachers also reflected on these processes when all the teachers at the lower secondary school were gathered together. They had learned to know each other better and learned more about each other's teaching. They had developed an understanding of the current situation in the school and thus conducted actual empirical analyses (Engeström 1999, 2001) during this second semester. In addition, they learned about each other and the pupils, visibly became more competent together, and developed competence in giving each other feedback and advice (Postholm 2008b). When reflecting together, I structured the response processes and saw that it was necessary to let the teachers be generous to one another and give each other positive feedback (City et al. 2010; Junge 2012; Huzzard, Ahlberg, and Ekman 2010). The teachers perceived that they had confidence in each other, but when sitting in a circle and waiting for responses from teachers who had conducted focused observations on their teaching, they felt vulnerable. I supported the teachers in this situation by giving them a structure for accomplishing the reflection process together. First, the teacher who had taught should reflect on his or her teaching; next, every teacher should individually give two positive comments. Hence, at the end of the semester, when they had developed trust in each other, I encouraged them to ask questions and give each other advice as a result of their observations (Postholm 2008b). This enabled them to talk to each other and to put words to their daily practice (Ambler 2016).

For the teachers in this example, the Change Laboratory lasted for almost a year. The Change Laboratory during the first and second semesters can be labelled Change Laboratory I and II, respectively. During Change Laboratory I, the teachers managed to make the project their own, and during Change Laboratory II, they developed an understanding of their own and the others' competence. Hence, they had developed a collective actual development level, and the tacit knowledge became manifest for them. At this stage, it was time to develop their practice. During Change Laboratory II, they developed a new model for development with a specific focus on mediating artefacts. According to the team leader, they wanted to continue with observations and reflections, and wished me to continue as an observer and reflection partner. Furthermore, they now also wanted me to include theories on metacognition, learning strategies and variation in teaching methods in reflection processes and, in short, lectures (Postholm 2008b). The teachers had, first, to be aware of their own tacit knowledge (Polanyi 1967) before they could appropriate (Wertsch 1998) new knowledge (Postholm 2008b). My role as a researcher in the teachers' development process in this project was to

contribute both form (structure for giving feedback) and content (theory, new knowledge) and provide mirror data (Cole and Engeström 2007) for the reflection processes. Since they wanted me to continue, it seemed that they had experienced the researcher's presence in practice as positive for their reflection processes (Ermeling and Yarbo 2016; Grau et al. 2017).

During the second semester, both the teachers and I had observed teaching and collected mirror data (Cole and Engeström 2007) so that everyone was aware of the current situation in the teaching processes. The teachers also wanted to continue with the processes, with my participation. The duration of the Change Laboratory was then expanded, and I also expanded the researcher's role. I functioned as an action researcher during the teachers' action learning within the framework of a formative intervention project, and this entailed an organisational focus on the development processes (Elmore 2000).

I supported the teachers in their action learning (Postholm 2008b) by giving them feedback on observed practice and connecting their practice to new knowledge. In addition, I conducted action research on these action learning processes, collecting mirror data (Cole and Engeström 2007) to be analysed together with the teachers, in order to enhance their development. When supporting the teachers in developing their practice, I also reminded them of the overall aim of their work: that their focus on various work methods and learning strategies contribute to every pupil's subject and social development. In this way, the action learning and action research processes conducted with the teachers in their classrooms were also connected to the overall goal of development of the school, and thus to the system level and a joint object, as is the intention in formative interventions (Engeström and Sannino 2010; Leontév 1981). Thus, I argue that both action learning *and* action research complement formative intervention studies to increase the likelihood of development.

## Concluding reflections

As the research on teachers' professional development in school presented in the article indicates, schools and teachers need external support when developing their own practice. Researchers can help leaders and teachers to create development questions deduced from objects or overall goals to act on and can support them when they are trying to develop their teaching practice towards the objects. Such support is, according to the example project, necessary in educational development. The project suggests that it is not sufficient for practitioners to move across Change Laboratories and concrete practice. It is also necessary that the researcher 'breaks down the wall' between these two settings to support developments in teaching. In this way, the researcher in formative interventions supports practitioners, outside their concrete practice in the Change Laboratory, in developing their collective practice towards a collective overall goal, whereas the action researcher supports practitioners in their practice. The action researcher can help practitioners to structure the feedback processes, based on concrete observations of teaching which are observed too by the researcher. The action researcher can also introduce and use new knowledge in these processes to sustain the learning. This, I suggest, is the key difference between the researcher's role in formative interventions and action research. The example

presented in this paper indicates that, when these two roles are combined, reflections on, and in, practice can also break down the wall between theory and practice, thus having the potential to lead to educational change. By utilising this example, the aim of this paper has been to demonstrate how the complementary roles of action learning, action research and formative interventions *together* create an alignment between processes at the classroom and system levels. I have also suggested that this complementarity can challenge and expand the researcher's role when supporting and researching school development processes. This means that development work in the classroom can move the practice of the whole school towards a desired object, thus leading to the school's development. The arguments for complementarity presented here are based on the examples from one project, thus representing contextualised knowledge. However, the reader is invited to use the argument as a cognitive tool. It is hoped that this can help support teacher development in similar situations and contexts.

### Disclosure statement

No potential conflict of interest was reported by the author.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial or non-for-profit sectors.

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