Enhancing Teachers' Understanding of How to Develop Students' Thinking

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Paper presented at the 17th ICOT, International Conference on Thinking 2015, 29th June-3rd July, in Bilbao, Spain.

Abstract

Schools around the world are trying to cope with rapid societal changes – fast progress of technical development, the globalization of communication, markets, and ideas, and the demand for equal education for different groups in society. If these challenges are to be met, for the benefit of mankind, it calls for good educational practice in every classroom, focused not only on teaching thinking to students, but also on their abilities to make productive choices, and to take responsibility for societal development in the future.

This paper is part of a larger study including a thorough investigation and analysis of current research literature on how education can meet the demands for cognitive development of students, compared with results from observations and teacher interviews, recorded at 125 lessons in classrooms with students from grade K-12, and 60 sessions in afterschool with students from grade K-6. The questions guiding this particular part of the study concern how (if at all) teachers' planning and carrying out classroom activities changed after having participated in development programs, and what methods seem to be more effective than others when changing teachers' classroom behavior. Twelve units in eight schools K-12 and afterschools K-6 participated.

The 'thinking classroom' presupposes that the teacher plans, assesses, chooses activities and tools, and arranges the setting, with strong focus on fostering students' habits of mind, rather than fixating on factual knowledge or covering of certain knowledge areas. The contextual and communicational interactions play a vital supporting role in a thinking environment. The development programs focused on these issues. Before teachers participated in the programs, observations showed little evidence of the anticipated criteria in the classrooms (Pihlgren 2013a, 2014). Though most teachers showed an understanding of what would develop the students' cognitive skills, they lacked the understanding of how to translate their theoretical knowledge into practice.

Some of the elements used in the development programs proved to be more effective, especially when combined: The impact on teachers' behavior in the classroom increased when the teacher was required to try out different ways to act; when they were required to present their experiences and get feedback from colleagues; researcher and leaders on what they had done and how; when the teacher read theoretical texts connected to what was tested and lectured on and the texts were discussed with colleagues; and when the principal or vice principal took active part during the program. An 'ideal type', a model of how a successful development program would look like was constructed and can be used for designing or evaluating teacher development programs, where the aim is to change teaching practice to address higher cognitive outcomes.

Keywords: Teacher development methods, feedback, cognition, learning, teaching styles.

Introduction

Swedish schools, as well as several school systems in other countries, are facing a drop of results of student performances in international tests (PISA 2012; PIRLS 2011; TIMMS 2011; Skolverket, 2014a). The world is experiencing rapid societal changes – fast progress of technical development, the globalization of communication, markets, and ideas, and the demand for equal education for different groups. Meeting these challenges requires good educational practice, focused on teaching thinking and creativity to students, as well as teaching democratic skills to students.

Basic demands were met

This paper is part of a larger study including a thorough investigation and analysis of current research literature on how education can meet the demands for cognitive development of students, compared with results from observations and teacher interviews, recorded at 125 lessons in classrooms with students from grade K-12, and 60 sessions in afterschool with students from grade K-6[1]. In the overall project of which this paper is a part, the results before the development programs, focusing schoolteachers' and afterschool teachers' planning and the actual effects on learning, have been previously analyzed (Pihlgren, 2013a, 2014).

Emerging from Bloom's (1956) classic 'Taxonomy of Educational Objectives' a revised version of the taxonomy analyzes the content from two dimensions: A *knowledge dimension*, highlighting what type of knowledge is being focused: factual, conceptual, procedural, and meta-cognitive; and a *cognitive process dimension,* displaying the thinking operations asked for: remember, understand, apply, analyze, evaluate, and create. The two dimensions result in twenty-four positions, all used and important in the teaching process (Anderson & Krathwohl, 2001).

The results from the previous analyzes show that all the grey marked positions (see table 1) in Bloom's revised taxonomy were met in most of the observed classrooms, and the dark grey areas were met in most afterschool activities. Contrary to what Anderson & Krathwohl (2001) state, qualitative differences were found in the taxonomy positions, some being more advanced when it comes to thinking and creative activities. Only some teachers reached these higher thinking levels of their students, depending on a productive praxis theory affecting how they taught and planned activities and context (Pihlgren 2013a, 2014).

Most of the observed classes in schools were thoroughly planned and well performed. However, the material shows big differences between afterschools. Even when staff uses the same term to denominate an activity, like 'baking', the quality of the cognitive outcome might be completely different. In some afterschools, cognitive content was found in all observations, even if advanced cognitive content was rare. Other afterschools showed very little cognitive content, even if the caring and the atmosphere most often were permissive and open. Within most afterschools, differences in

[1] Swedish afterschool programs, *fritidshem*, are attended by most children age 6-9 years, and some to 12 years, and are, although subject to parents' choice, part of the Swedish school system (Skolverket, 2014b). The literal translation of the Swedish concept *fritidshem* is 'leisure-time home'. In official documents by the Swedish National Agency for Education (*Skolverket*) the English translation is 'leisure-time center' (Skolverket, 2007). I will use the term *afterschool* in this text.

the ability to understand and meet the demand for learning activities seemed to be connected to the educational level of the staff[2].

Table 1. *Frequency of markings for school teachers and afterschool teachers (in parenthesis) in positions of Bloom's revised taxonomy in percentage of the total material of marks.*

THE KNOWLEDGE DIMENSION	**THE COGNITIVE PROCESS DIMENSION**					
	1. Remember	**2. Understand**	**3. Apply**	**4. Analyze**	**5. Evaluate**	**6. Create**
A. Factual knowledge	12 (10)	11 (8)	10 (12)	4 (3)	4(3)	2 (4)
B. Conceptual knowledge	7 (3)	6 (>1)	6 (3)	2 (1)	1 (>1)	0 (0)
C. Procedural knowledge	8 (15)	8 (12)	11 (15)	2 (1)	1 (1)	>1 (4)
D. Meta-cognitive knowledge	2 (2)	1 (1)	1 (1)	<0 (<0)	<0 (<0)	0 (0)

Higher cognitive levels were hard to reach

The student will learn to think productively and creatively by being given the opportunity to attain and practice good habits of mind (Gardner, 2009; Pihlgren, 2008). Good thinking supports learning and good thinking needs to be practiced and trained systematically during the whole school period. The literature review in the previous analyses (Pihlgren, 2013a, 2014) shows that, in order to reach higher cognitive goals in their education, teachers will have to let students make implicit experiences from a variety of angles, gradually taking them to generalized knowledge by challenging explicit cognitive work, training them in analysis, meta-cognition, and formative assessment. Teachers' planning should start in identifying central areas and desired results. Open dialogue and goal focused student interaction affect the cognitive outcome positively. Actions should focus on thinking and helping the students to uncover thinking patterns by presenting complex and authentic problems where the answer is not self-evident. Using thinking routines and contextual mediation will help the teacher to promote thinking and creativity. The teacher has to take responsibility for all activities going on in the classroom to create a 'community of learners'.

[2] The staff in Swedish afterschools is mainly of two categories: afterschool teachers, with a university degree, and caretakers, most often with a secondary school degree, but not necessarily in child care. I will use the term *afterschool teacher* for the university educated staff, 'fritidspedagoger', 'fritidslärare', and *caretaker* for the staff with other education, 'barnskötare'. *Afterschool staff* includes both categories. A university educated teacher, working mainly in school, is in the text called *schoolteacher*. When the term *teacher* is used, all university educated teachers are included, regardless of where they work. When *staff* is used, all the categories are included.

However, in the classroom intellectual activities and conventions compete – it is hard to reach high cognitive quality and keep all students active at the same time (Carlgren, 2011). From previous research we know that teachers state that they actively try to promote students' thinking. But a closer look at the practice in European classrooms shows that teachers rather require that students remember or reason from previous experiences (Sokol, 2012). Our analyses show that anticipated criteria were hard to reach in most of the observed classrooms and afterschools (Pihlgren, 2013a, 2014). Though most teachers showed an understanding of what would develop the students cognitively, they lacked the understanding of how to translate this knowledge into practice. The schoolteachers tended to plan focusing what should be taught rather than students' cognition. The afterschool teacher didn't always plan their activities and when they did, they tended to focus on the activities, not reflecting on the learning content. Without understanding the difference, teachers seemed to accept activities, methods and structures mechanically.

Method

This paper focuses on the schools and afterschools which initiated a development program for their staff, following the first round of observations. The aim is to find if teaching practice changed after participating in the program to address higher cognitive outcomes, and what methods (if any) contributed to change.

Questions

The questions guiding the analysis have been:

- *How (if at all) do teachers' planning and carrying out classroom activities change after participating in development programs?*
- *What methods seem to be more effective than others when changing teachers' behavior?*

Participants and ethical considerations

The investigation was performed as a combination of traditional qualitative research methods as observations and interviews, and participating research, where the researcher participated as lecturer, educator, and mentor during the development program. This active participation called for extra considerations in validity, and was met by adding interviews of a sample of staff members and principals to the material.

Twelve units in eight schools/afterschools (see table 2) participated in development programs during 1-3 years, where assignments to the staff were combined with lecturing, reading literature, and discussing with colleagues. Group development combined with some individual tasks was motivated by the literature review, targeting group development programs as being more effective. The combination of methods and their structure differed between the participating units (table 5). Some units combined the auditorium presentations of teacher assignments with feedback from the researcher and colleagues, some classroom visits, and some combined the assignment with a voluntary written report. In some schools the principal or vice principal took active part in the development program.

Table 2. *Presentation of participating schools and afterschool.*

Unit	Type of unit participating	Participating staff
A	School grade K-9 Afterschool grade K-5	17 8
B	School grade K-9 Afterschool grade K-6	14 4
C	School grade 10-12	27
D	School grade K-5 Afterschool grade K-6	28 10
E	Special school grade K-9 Special afterschool grade K-6	7 7
F	Afterschool grade K-6	39
G	Afterschool grade K-6	43
F	Afterschool grade K-6	24

The participating unit paid for the school development program. This meant that the choice of methods and combinations was regulated by the unit's needs and interests, as was the length and the extent of the program. The researcher had a consulting role at this stage, leaving the decision to the principal. This meant that the final material contained a variety of methods and combinations, in fact at the end contributing to the understanding of what had been effective or not. The research part of the program was not included in the financial deal with the school, and was financed by Ignite Research Institute. The schools had no impact on how the results were analyzed or presented.

The head of the unit had agreed to data being collected. All participants were informed, and had the opportunity to end their personal participation in research at any time. The material was coded and names were changed for anonymity. The material is used in five reports with different focus.

Data collection

From each participating unit a sample of the participating staff members (12 group interviews) and principals (6 individual interviews and 2 in pairs) was interviewed about the impact of the development program, in semi-structured interviews, at the end of the program. The interviews were also used as a triangulation point to check the validity of the results from the observations. Staff respondents were chosen to represent differing aspects concerning age, gender, and profession. Most schools presented results from student-parent surveys during the period and the results from and analyses of these were discussed during interviews and integrated in the interview material.

The chief material was collected in eight of the participating units, where each participating schoolteacher or team (afterschools) was observed and interviewed before and after participating in the development program. Observation notes were taken using a chart where every new sequence in the observed lesson/activity was recorded, stating time, actions, and observed outcomes. Contextual information was noted. The cognitive content in each sequence was assessed, using Bloom's revised taxonomy (Anderson & Krathwohl, 2001). The observed person met with the researcher the same

day, for a one hour interview, where feedback on the observation notes was given and discussed. These observations and interviews concentrated on teachers' planning and the actual effects on learning (cf. Pihlgren, 2013a, 2014) and not on the development program in particular.

Data from events during the ongoing development program, and from teacher presentations in the beginning, in the middle, and at the end of the project were collected. This material consisted of field notes taken during the process, when presentations were made, and the digital presentations.

Analysis and methodological considerations

Notes were taken during the interviews with samples of staff members and principals on these areas:

- Personal development and satisfaction.
- Development in school/afterschool.
- Assumed components affecting the results.

In observations and interviews the cognitive knowledge positions in Bloom's revised taxonomy (table 1) were used. Conclusions were made about changes in teacher praxis theory on planning and teaching actions compared to the first observations, as well as on structure, control, and intellectual challenge. The work was limited to the teacher's choices connected to students' thinking, not investigating the cognitive processes within each student.

The analysis of presentations from teachers was sorted using the following criteria:

- Vocabulary.
- Cognitive aspects.
- Analysis.

Important events in the ongoing process were analyzed by using 'program theory' (cf. Vedung, 2009), describing process events such as input/interventions, changes/processes, output/final achievement, and outcome (Vedung & Dahlberg, 2013). The events of the program of each unit were structured in tables and a timeline (table 3-6), later compared to an 'ideal type' (table 7), a model of what a successful development program would look like.

However, results or events affecting the outcome might have been misinterpreted or missed. Marking the taxonomy meant making choices and interpretations. Important material might have been lost. All the same, interesting results have been highlighted. The participating staff was aware that the observations were evaluative. Keeping this in mind, the result will probably show what they were capable of doing at their best. The result cannot presume to be valid in all schools. However, the material is extensive and points to important trends.

Literature

The teacher's ability is vital to students' success (Chetty et al, 2011; Hattie, 2009; Jensen, 2005; McKinsey & Co, 2007). Teaching is a cognitive ability, acquiring extensive experience to master the complex learning context (Shulman, 2004; Willingham, 2009). Not all teachers reach, or try to reach, a level of expertise (Joyce & Calhoun, 2010; von Oppel & Aldridge, 2015; Willingham, 2009). Even when teachers are organized in teams, teaching is not discussed with colleagues, and teachers lack tradition of collegial pedagogical development (Hargreaves, 1998; Lauvås et al, 1997).

Teaching styles

All teachers act in their everyday school practice from a more or less explicit pedagogical "praxis theory" (Pihlgren, 2013a; cf. von Oppel & Aldridge, 2015; Mitchell, 2005). This is often a concoction of experiences in the classroom, teacher training, examples from others, and in time expertise. At least three main groups of theories affect practice in today's classrooms (Pihlgren, 2011a): The *interactive theory* (cf. Vygotsky) and the *maturity theory* (cf. Fröbel, Montessori, Steiner) see the learner as active, as opposed to the *behaviorist* view (cf. Pavlov, Skinner) that individuals will learn when tempted by rewards or in fear of punishment (Pihlgren, 2011b). In the behaviorist tradition, learning and maturing is more or less considered to be the same process (Carlgren, 1999). In the maturity tradition learning is taking place as an effect of the student maturing. In the interactive theory base, the student will learn in interaction and thereby mature and develop.

Previous analyses (Pihlgren, 2013a, 2014) show that depending on how theories were interpreted they either supported the teacher's intentions to teach students to think, or not. Teachers with different praxis theories stressed different didactic aspects. Five teaching styles were found:

The *common teaching style* controlled the content of what was to be learned by planning the student process closely, using several different tasks and methods, most commonly lecturing, tasks, and home assignments. The knowledge and cognitive processes initiated were concentrated within the grey area of Bloom's taxonomy (table 1). The dialogue was controlled by the teacher, and questions were focused on evaluating the students' knowledge. This plan is closely related to behaviorist theories.

The *student investigative teaching style* was more common in classes for younger children, practical-aesthetic subjects, and afterschool activities. The lesson started by introducing new material aiming to help the students to develop. The students then explored their own areas of interest in whatever way they chose. The students had time to apply and create factual and procedural knowledge, but analyzing, evaluating, or meta-cognitive reflection were not addressed (the dark grey areas in table 1). The planning style is related to maturity theories.

The *scaffolding teaching style* was observed in a small group of teachers, planning what was to be taught and how in ways leading to higher order thinking in class. Analytic, evaluating, open-ended and meta-cognitive questions were posed. Analysis, guided experiments and tasks, lectures, and exploratory and creative elements were mixed. This style addressed more cognitive and knowledge targets than any of the other planning styles, and is connected to interactive theories.

The *'moralistic' teaching style* was observed in some of the lessons, or parts of lessons: neither the product nor the process seemed planned towards a cognitive goal. This teaching style is connected to behaviorist theories but the teacher is occupied with teaching the students how to behave, rather than reaching the goals.

The *laissez-fair teaching style* was only observed in afterschools. This style is connected to maturity theory but seems to lack pedagogical intentions.

Teacher development

Traditionally, development programs are individual information, courses, or lectures, built on 'deficit' models, presupposing that teachers lack knowledge or need to be corrected, rather than on a

'growth' model, where the professional development is built on the teacher's inquiry (Huberman & Guskey, 1995; Mouwitz, 2001; Skolverket, 2014c). None of these methods has proven effective when it comes to changing the actual behavior of staff (Ekman, 1999; Sandberg & Targama, 1998).

There is a multitude of ways to teach students well, adapted to complex and dynamic characteristics of specific contexts and to differences among teachers (Guskey, 1995; Joyce & Calhoun, 2010; Skolverket, 2014c). The lesson context is complex – hundreds of micro-events occur within seconds (Pihlgren, 2013c). It is hard to isolate singular universal aspects when teaching teachers to get high quality results. A change in professional behavior calls for more complex and thorough systems (Hargreaves, 1995). To learn, teachers need feedback on what they do as they teach (Smylie, 1995), and help to see what presumptions or theories lie behind their actions (Campoy, 2005; Tillema & Imants, 1995).

A systematic and conscious use of observations, evaluations, experiments, and collegial discussions has proven effective (Bjørndal 2005, Cordingley et al, 2005; Pihlgren, 2013b; Svedberg 2003; Timperley et al, 2007). Reflections in group, especially heterogeneous, will contribute to a higher awareness of how underlying ideas guide the practice (Brusling & Strömqvist, 2007; Lauvås et al, 1997). At best, the differences give synergistic effects, resulting in a deeper understanding of why problems might occur and how they may be solved, giving each participant a broader competence than they might have had if analyzing on their own (Andersen, 1987; Brusling & Strömqvist, 2007). Programs are more successful when teachers have the opportunity to identify and develop areas they find important (Skolverket, 2014c; Mouwitz, 2001). According to Timperley (2011) effective teacher development should start in considering the students' learning, and take teacher discussions and actions through the following steps:

1. What knowledge and abilities the students need to reach the goals.
2. What knowledge and abilities teachers need to help students reach the goals.
3. Improvement of teacher knowledge and abilities.
4. Giving students new learning experiences.
5. What effects the changed actions have had.
6. Back to step 1 and continue the circle.

It is important that the program is supported by strong local leadership and structures (Joyce & Calhoun, 2010; Timperley, 2011). It's also essential to give time for a learning community to develop within the group (Bjørndal 2005; Joyce & Calhoun, 2010). By systematic and repeated confrontation, the goals and ideas will eventually become an integrated part of the understanding of staff members, and will then have an impact on their actions in practice (Pihlgren, 2013b).

Teacher development methods

Some systematic ways to go about collegial learning inspired the development programs methods.

Lesson studies are directed towards improving a teaching and learning process by the cooperative work of a group of teachers, planning a lesson together, observing the actual outcome by visiting a colleague performing the lesson or by filming it, then in group revising the plan and again testing it in action (Lewis & Hurd, 2011). In the similar *learning study* the teacher team uses research and theories to develop the lessons (Gustavsson, 2008). The teacher varies the ways the student meets a

particular *learning object* to get the student to grasp certain critical aspects (Holmqvist, 2006; Marton & Booth, 2000).

Principal's observation/feedback has proven particularly efficient (Pihlgren, 2013b). *Collegial observations and feedback* cover a broad variety of the teacher professional practice: relations in classroom, the learning environment and outcome, and student interplay (Pihlgren, 2004). Proceeding from the recorded events of the lesson, strengths and improvements are discussed (Einarsson et al, 2002). The feedback has positive effects if it's asked for and if the auscultation is highly structured (Lauvås et al, 1997). *Instructional rounds* is a version of feedback where a group of colleagues observes part of a lesson, takes notes, gives feedback, and discusses questions (Roberts, 2009).

Response as feedback of (notably written and creative) work is most commonly exercised at some stage in the working process and aims at developing the final product (Dysthe et al, 2002; Hetland et al., 2007; Wiggins, 1998). By getting help during the process, the producer realizes how the product is perceived by others, where its strengths and weaknesses lie, and hence, what needs to be worked on. In *Case Study Analysis* teachers meet to investigate, analyze and improve practice from teachers' formalized and written stories (Campoy, 2005), combined with reading research work to enrich the analysis.

Group mentoring or coaching can enrich teachers' repertoire of how to cope with professional dilemmas (Andersson & Persson, 2002; Pihlgren & Fröman, 2009). The mentor role is to ensure that the dialogue is focused and functional by nurturing a culture of openness (Andersen, 1994). Change and development are accomplished between the sessions rather than in the sessions.

Results and Analysis

The aim of the teacher development programs in this study was to get more teachers to embrace methods and theories close to those used in the *scaffolding teaching style,* addressing advanced cognitive and knowledge targets when teaching their students (cf. Chetty et al, 2011; Hattie, 2009; Jensen, 2005; McKinsey & Co, 2007). A basic program was constructed from models for teacher group development (Andersson & Persson, 2002; Hargreaves, 1998; Lauvås et al, 1997; Pihlgren & Fröman, 2009; Roberts, 2009), rather than using less effective traditional, individual models (cf. Ekman, 1999; Huberman & Guskey, 1995; Mitchell, 2005; Mouwitz, 2001; Sandberg & Targama, 1998; Skolverket, 2014c). The design included several different components (cf. Bjørndal 2005; Cordingley et al, 2005; Pihlgren, 2013b; Svedberg 2003; Timperley et al, 2007) to address the complicated learning context in schools and afterschools (Guskey, 1995; Hargreaves, 1995; Holmqvist, 2006; Joyce & Calhoun, 2010; Marton & Booth, 2000; Pihlgren, 2013c; Skolverket, 2014c). All participating units met with the researcher and colleagues for lectures and discussions of theory and didactics (Andersen, 1994), discussing research findings and literature (Campoy, 2005; Gustavsson, 2008), and presenting the results of their assignments between sessions (Dysthe et al, 2002; Einarsson et al, 2002; Hetland et al., 2007; Wiggins, 1998), e.g. observations of students, planning and assessing lessons/activities and student learning, trying out new methods/tools, or making contextual changes to enhance students' learning.

Results of the development programs

The interviews with staff and leaders show that the development program was perceived more successful in some units than to others.

Table 3. *Summary of perceived results of the development programs in each participating unit.*
P indicates that positive components were mentioned, N indicates that negative components were mentioned.

UNIT	STAFF			LEADER			INTENDED RESULTS ON TEACHING
	Personal development and satisfaction	Intended results on teaching	Assumed components affecting the results	Staff development and satisfaction	Intended results on teaching	Assumed components affecting the results	
MAUVE	High	High	P: Collegial discussions, high educational level of staff	High	High	P: Collegial feedback in pairs, high educational level of staff	YES
BROWN	High	Some	N: Disruptions in program	Low	Low	N: Disruptions in program, staff changes	-
RED	High	High	P: Collegial discussions, reading, lectures	High	Some	P: Feedback, assignments, lectures N: Low staff educational level	Some
ORANGE	High	High	P: Collegial discussions, lectures	High	High	P: Feedback, assignments, recurrent contact with researcher N: Reorganization	YES
YELLOW	High	High	P: Collegial discussions, reading, feedback, lectures	High	High	P: Feedback, assignments, lectures, reading	YES
LIME	Some	Some	P: Already high staff educational level	Some	Low	N: Goal conflicts within the group	-
GREEN	High	High	P: Collegial discussions, reading, lectures	High	High	P: Feedback, assignments, reading	YES
TUR-QUOISE	Mostly high	High	P: Collegial discussions, feedback, lectures	Mostly high	High	P: Feedback, assignments, lectures, reading, length of program	YES
BLUE	High	High	P: Collegial discussions, reading, feedback, lectures	High	High	P: Feedback, assignments, reading	YES
INDIGO	High	Some	P: Collegial discussions N: Little time to do the assignments	High	Some	P: Systematic approach, length of program, time given for assignments N: Staff prioritized other things	Some
VIOLET	High	Some	P: Collegial discussions, lectures N: Little time	High	Low	N: Staff prioritized other things	-
PURPLE	High	High	P: Reading, feedback, lectures	High	High	P: reading, feedback, lectures	YES

As is shown in table 3[3], the staff rates the value of the development programs higher than the leaders, and almost all were satisfied with their personal development, partly because they, within

[3] The units have been color-coded and the order in which the participating units are presented has been changed, compared to table 2, to guarantee anonymity. Even though this research is built on a qualitative

the assignment, had the opportunity to develop areas they found important to their practice (cf. Skolverket, 2014c; Mouwitz, 2001). In six of the twelve units (mauve, orange, yellow, green, turquoise, blue, and purple), staff and leaders estimated that the development program had had intended pedagogical and didactic effects. The explanations to why the programs were efficient differ. Staff tended to point at the collegial discussions and to some extent to getting more knowledge of how to connect theory to practice from lectures and reading research (cf. Brusling & Strömqvist, 2007; Campoy, 2005; Lauvås et al, 1997; Tillema & Imants, 1995). Most leaders agreed on this, but stressed that the assignments and the presentations in auditorium created an atmosphere where production and open dialog was promoted, especially when feedback on the products was given (Andersen, 1987; Brusling & Strömqvist, 2007; Smylie, 1995).

In three units (brown, lime, and violet) the program had no perceived effect on the pedagogical practice. Brown unit had a too disruptive process to succeed. The Lime unit staff pointed at their already high educational level to explain why the development program hadn't had such a big impact, whereas their principal stressed professional conflicts within the group. The Mauve unit staff also had high educational competence at start but had a successful outcome. The principal of the Violet unit thought that the poor result might be due to disengagement among the staff, but the staff felt they had had too little time to fully participate in the program.

Results from presentations of assignments

In many units the assignment presentations showed improvement over time in the three chosen criteria: Vocabulary, cognitive content, and analysis. Similar patterns were found in those units who rated program success. The presentations increased in use of professional vocabulary, rather than using every-day concepts as in the beginning of the program. They went from presenting subject content or activities to presenting cognitive aspects, and from "storytelling" idealizing or funny stories of what the students liked, said or did to presenting analysis and/or posing problematizing questions to their colleagues on the area of the assignment. None of the three units where programs had poor effect showed much change in the presentations, with some individual exceptions.

Most progress was found in the afterschool presentations, where the professional vocabulary, the cognitive content, and analysis and problem posing were rare in the beginning of the programs, and common at the end.

Comparing results from observations and interviews

Eight units were observed before and after the development programs. With some individual exceptions, no overall differences were seen in the observations of staff from brown, lime, and violet units. Overall improvements were found in mauve, green, turquoise, blue, and purple units. These units increased the number of positions noted in Bloom's revised taxonomy (Anderson & Krathwohl, 2001), and especially in the knowledge dimensions analyze, evaluate, create, and in the meta-cognitive dimension. Here, most teachers and caretakers had changed their teaching style more or less thoroughly, and exclusively from teaching styles addressing less cognitive content to styles addressing higher cognitive content. The changes showed a pattern, as illustrated in figure 1.

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method, I have chosen to present some of the extensive material in tables, to give the reader a comprehensive overview.

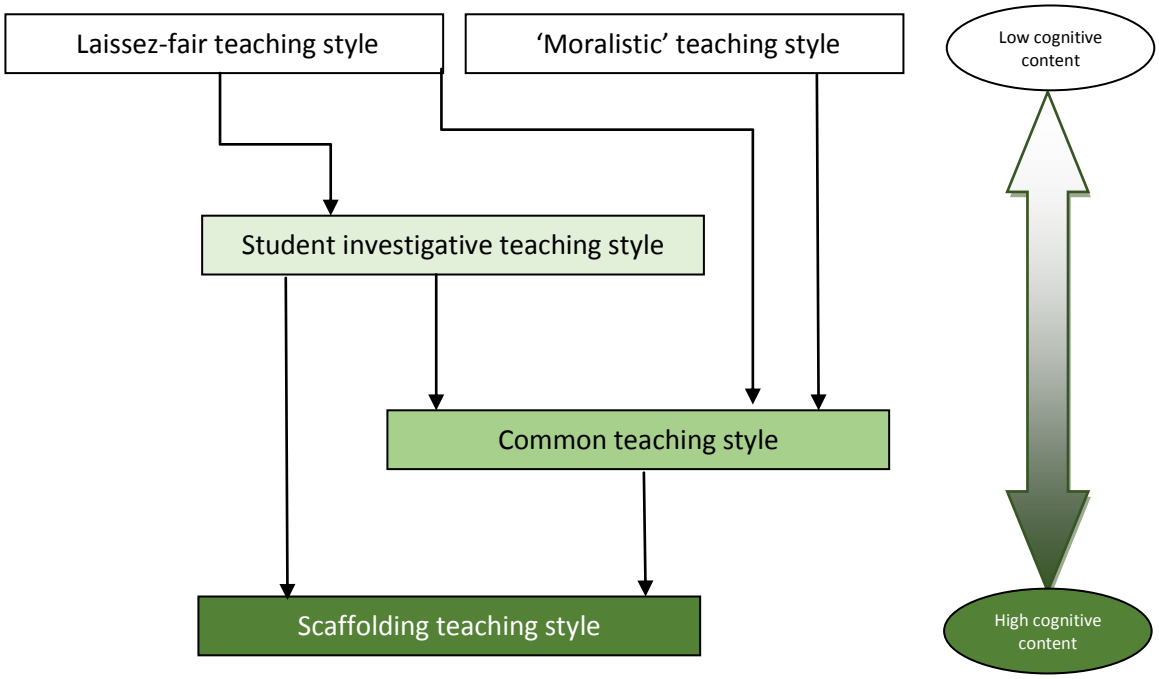

Figure 1. Pattern of teacher and caretaker movements between teaching styles.

The afterschool staff who had displayed a *laissez-fair teaching style* in observations and interviews before the program either showed a *student investigative or a common teaching style* after the program, with higher involvement in students' activities, and organized activities for students:

Excerpt 1. *The playground at Mountain Valley*[4] *afterschool, a year after the first observation.*

Around 90 students are playing in different constellations. Snacks are distributed by students from a table. Two students are in charge of the list, marking students who are fetched by their parents. All staff but two are involved in different student activities in the yard: Playing hide and seek, football, making a show, building Lego. Some students play two or three together, and some on their own. Caretaker Eric is working as 'watcher', looking out for possible problems or conflicts, a scheduled staff assignment every day. Afterschool teacher Kim works as a 'wanderer', also a scheduled position – passes around the playground, trying to engage lonely students in group activities and play. Afterschool teacher Ann is initiating painting the pavement with watercolor.
Ann: So please gather around me. Has everyone got a brush? Well, before we start painting, you see we only have red, yellow, and blue paint. So how are we going to do if we want more colors? Do you know?

Compared to the first observation, where staff in this afterschools seemed at a loss on what they should do, they now organized for and participated in student activities. The teaching style is *student investigative*, with elements of *common teaching style* in the organized, lesson-like activities like the pavement water color painting. The afterschool interviews showed that staff was more conscious of what the students learnt during the activities. With new knowledge on how to plan activities, staff found the move from *laissez-fair style* to *the student investigative style* easy, probably since the underlying ideas of both is connected to maturity theory (Pihlgren, 2013a, 2014). They expressed difficulties in planning for higher cognitive levels in afterschools, and tended to use the familiar *common teaching style* even when they didn't intend to.

Those who were classified as using a *student investigative teaching style* in the first observations either moved to a *common* or *a scaffolding teaching style* in the second observation. The interviews

[4] The names used in the excerpts are the same as used in earlier analyses (Pihlgren, 2013a, 2014).

confirmed that the move depended on how secure they felt with the ideas and methods of the scaffolding teaching style. The common style felt more familiar and was considered less risky.

The few observed who had displayed a *'moralistic' teaching style* in the first observation had moved to a *common teaching style*, and seemed to control the order in class by other means than moralizing or pastime activities, as in Ms. Jessica's case:

Excerpt 2. *Ms. Jessica's start of lesson in 2nd grade, two years after the first observation.*

The students are getting seated at their desks. An assignment is written on the smart-board and material is laid out on each desk. Jessica meets everyone at the door, takes their hand and says hello. The students start working on the task in silence.
Ms. Jessica: I think everyone is here now! Who has solved the problem yet? Who is still working on it? All right – let's try to solve it together. Who'll start to give us some ideas? Emma, how did you go about solving it?
Emma: I drew the chickens and then the hens and then paired them up.
Ms. Jessica: OK, so that's one way to solve it. Did someone else do it differently? */several hand in the air/* Martin?
Martin: I took the number of chickens and minused with the hens. That made 4 and I divided them too.
Ms. Jessica: OK, can you show us on the smart-board?
The task discussion goes on for some more minutes. The students then continue to work in their mathematic exercise books.

The big group of teachers that used the common teaching style before the program had adopted the *scaffolding teaching style* or some components. Their planning and structure had changed, like Mrs. Susanne's:

Excerpt 3. *Ms. Susanne's lesson in grade 2, one year after the first observation.*

Mrs. Susanne sits by the white-board, where she has written 'Fiction' in a circle. The students are seated in a semi-circle facing the white-board. They listen to a sound file with a dramatic excerpt from a children's book.
Mrs. Susanne: So, what we just heard was a type of text called 'fiction'. What do we know about fiction? How would you describe fiction? What do you say, Ernst?
Ernst: It's made up, like fantasy.
Mrs. Susanne: OK */writes down fantasy, starting on a mind-map/* What else?
Ando: It's a sort of story, things happen.
Mrs. Susanne: Aha */writes on the mind-map/* So could it be fiction and still be a real story?
Nils: Well, you could take something that had happened to you and write about it but sorta' change it…
Mrs. Susanne: So what makes it fiction in that case?
The mind-mapping goes on for a while and is followed by the introduction of each student writing a fiction story of their own: Start by discussing ideas with another student, brain-storm in a mind-map of their own, check their ideas for peer-feedback, and eventually construct a time-line for the story.

The lesson is well structured and Susanne uses methods from the *scaffolding teaching* style (e.g. visible thinking tools, open-ended questioning, peer-feedback, and analytic concepts), and thereby scoring more advanced position in Bloom's taxonomy. The interviews of these teachers showed that they had gone from planning activities to closely plan for the learning outcome of the students.

The teachers who were already using the *scaffolding teacher style* expressed that they were more conscious of what they were doing and how, planning more reflectively, and using a greater variety of methods than before the development program. This was confirmed in observations.

Effective and non-effective conditions, methods and events

Some of the conditions differed between the units, such as length of program, number of sessions, number of participants, if mandatory participation was stressed, and if the principal or vice principal participated actively. The differences are accounted for in table 4 and 2.

Table 4. *The conditions of the participating schools' and afterschools' development programs.*
X shows that the criteria was met entirely, P that it was met by parts of the staff.

UNIT	CONDITIONS					Results on teaching
	Extension	Number of sessions	Mandatory participation	Principal participating	Principal leading in-between workshops	
MAUVE	2 years	10	X	P	P	YES
BROWN	1 year	4	-	-	-	-
RED	1 year	9	X	X	P	some
ORANGE	3 years	15	X	P	P	YES
YELLOW	2 years	12	X	X	X	YES
LIME	2,5 years	10	X	P	-	-
GREEN	1,5 years	8	X	X	X	YES
TURQUOISE	2,5 years	14	X	X	X	YES
BLUE	2 years	10	X	X	X	YES
INDIGO	3 years	12	-	P	-	some
VIOLET	2 years	8	-	-	-	-
PURPLE	1,5 year	8	X	P	P	YES

Most units had eight or more sessions, whether they were successful or not. Brown unit only had four sessions and reached no result. All effective programs lasted for 1, 5 years and more. However, some of the less effective lasted for 2-3 years. Length or number of sessions don't seem to explain the results, but it is fair to presume that a program has to cover 1,5 years at least and eight or more sessions to effectively confront the participants with new goals and ideas, and for the ideas to become an integrated part of their understanding (Andersen, 1994; Pihlgren, 2013b). Mandatory participation for all staff seems to have some importance. The participation of the leader seems to be strongly connected to success (cf. Joyce & Calhoun, 2010; Timperley, 2011). Indigo unit had limited success of the long and well planned program probably because the principal was mostly absent.

Table 5. *The combination of methods chosen by the participating schools and afterschools and the results of the development programs. X shows that the criteria was met entirely, P that it was met by parts of the staff.*

UNIT	USED METHODS									Results on teaching
	IN SESSIONS				BETWEEN SESSIONS					
	Lectures	Discussing research literature	Presenting assignments	Colleagues /researchers feedback on assignments	Reading research literature	Group assignments	Voluntary written report	Colleagues observing and giving feedback in pairs	Researcher observing and giving feedback	
MAUVE	X	X	X	X	X	X	-	X	X	YES
BROWN	X	P	X	-	P	-	-	X	X	-
RED	X	X	X	X	X	X	-	-	-	Some
ORANGE	X	X	X	X	X	X	-	-	-	YES
YELLOW	X	X	X	X	X	X	-	-	-	YES
LIME	X	X	X	-	X	X	-	-	X	-
GREEN	X	X	X	X	X	X	-	-	X	YES
TURQUOISE	X	X	X	X	X	X	-	-	X	YES
BLUE	X	X	X	X	X	X	-	-	X	YES
INDIGO	X	X	X	-	X	X	X	X		Some
VIOLET	X	-	X	-	-	X	-	-	X	-
PURPLE	X	X	X	X	X	X	-	-	X	YES

The participating schools and afterschools chose additional methods, motivated by research, but in different combinations, see table 5. Some methods seem to have had larger impact on the success of the development program than others. All the successful programs were a combination of lectures, reading and discussing research literature, and giving feedback on group assignments. Merely presenting assignments did not seem to have positive effects, probably because this didn't encourage an investigative and reflecting learning community (Bjørndal 2005; Joyce & Calhoun, 2010). Collegial observation and feedback in pairs didn't automatically seem to give positive results, nor did researchers observation and feedback[5]. Written reports were only introduced at indigo unit and had little or no impact, probably because it was free to choose.

Events during the ongoing development program

Events during the ongoing process, such as when elements or methods were introduced, have been marked in a timeline, see table 6. In some of the participating schools and afterschools events beside the development program had an effect on the outcome.

Introducing planning and assessing as subjects for lectures and for assignments proved more effective than focusing student observations or general didactic areas, such as thematic units, student participation, or pedagogical theories. Early introduction of group assignments with feedback, and reading and discussing literature, established positive results.

Where a learning community culture was established early, the results were positive. On the other hand, the programs often clarified underlying problems by illuminating old conflicts or bias that had to be dealt with by the researcher, the group, and the principal, for progress to go on:

Excerpt 5: Excerpt from field notes, Meadow afterschool staff, session 13.

One group has continuously presented their old methods, with little connection to what the rest of the groups have been exploring and with poor cognitive content. When one of the members ends the presentation this time, hands are raised.
Caretaker 1: Yes? */to a colleague from another group/*
Caretaker 2: When you all present I get the notion that you're not working together. It rather seems as if you're are two afterschools in one.
There's a silence, when members of the presenting group look at each other. The room is very quiet.
Caretaker 1: Yes, you're actually right, we're split. But we're working on it.
Caretaker 2: See, I really think you have to; it will have a great impact on the students. They'll know, you know.
Caretaker 1: Yeah, I guess.
Afterschool teacher 1: I'm not so sure about that, I think we do a professional job out there with our kids.
Caretaker 1: Well, I…
Researcher: So, let's help them with what to look for. Discuss two by two what could be signs of the students' picking up on a grown-up conflict.

The timeline (table 6) implies deeper explanations to some of the results. The disrupted and short process of brown unit, explaining their poor results, is clarified. Orange, turquoise, and blue unit were subject to re-organizations of management, but as this led to higher participation of their principals it probably supported success (cf. Joyce & Calhoun, 2010; Timperley, 2011). Lime unit changed staff during the process and, as indicated earlier, communication difficulties within the group were made visible by the development process, holding development back. Red unit also had

[5] The researcher's observation and feedback was used as an evaluating tool but could also be considered a development tool.

some internal problems, as indicated, but these were dealt with and the progress towards a learning community was enhanced, indicating that their process of one year might have been too short.

Table 6. Timeline of events that might have affected the outcome of the development programs.

UNIT	BEGINNING	MIDDLE	END	
MAUVE	Researcher observes. Discussing research literature intro. Structured planning intro. A learning community established at start.	Collegial feedback in pairs intro. Structured assessing intro.	Researcher observes.	YES
BROWN	Researcher observes. Student observations intro.	The program was delayed for 3 months.	Researcher observes. The program restarted and put on hold because of staff changes.	-
RED	Before starting the program, the vice principal tried several ways to develop practice, with resistance from staff. Discussing research literature intro. Feedback on assignments intro. Student observations intro. Structured planning intro at the end.	At the beginning of the period the whole group returned without having made the assignment. Structured assessing intro.	As an effect of the program, the vice principal realized that one staff member lacked satisfying competence. A learning community established.	Some
ORANGE	Staff responsibility divided between several vice principals, some participating and some not – their groups not producing quality presentations. Student observations intro. Thematic units intro. Student participation intro.	All groups but one produces high quality presentations. Structured planning intro. Discussing research literature intro.	Staff, and leadership reorganized, leaving one vice principal in charge. A learning community established. Structured assessing intro. Feedback on assignments intro.	YES
YELLOW	Before starting the program, the vice principal tried several ways to develop practice, with resistance from staff. Discussing research literature intro. Feedback on assignments intro. Structured planning/assessing intro.	Program shared with rest of staff. A learning community established. Student observations intro.	Program shared with rest of staff at the end.	YES
LIME	Researcher observes. Discussing research literature intro. Pedagogical theories intro.	Researcher observes at the end. Changes in staff, new staff hired. Structured planning/assessing intro.		-
GREEN	Researcher observes. Discussing research literature intro. Feedback on assignments intro. Student observations intro. Structured planning/assessing intro.	Researcher observes at the end. A learning community established.		YES
TUR-QUIOSE	Researcher observes. New principal is hired at the end. Discussing research literature intro. Structured planning/assessing intro.	Researcher observes at the end. A learning community established. Feedback on assignments intro.		YES
BLUE	Researcher observes. New vice principal is hired at the end. The new principal decides to lead the programs in both groups. Discussing research literature intro. Feedback on assignments intro. Student observations intro. Structured planning/assessing intro.	Researcher observes at the end. A learning community established.		YES
INDIGO	Collegial feedback in pairs intro. Pedagogical theories intro. Student activity intro.	Second collegial feedback in pairs. Voluntary written report intro half of the group starts. Thematic units intro.	Only one teacher writes voluntary report. Discussing research literature intro. Third collegial feedback in pairs.	Some
VIOLET	Researcher observes. Structured assessing intro.		Researcher observes.	-
PURPLE	Researcher observes. Discussing research literature intro. Feedback on assignments intro. Student observations intro. A learning community established.	Structured planning/assessing intro.	Researcher observes.	YES

The lack of educational experience in red unit also might have been a variable, something that was observed in several of the participating afterschools. Assignments and the conditions had to be clarified before the group was ready to take on the intellectual work needed, as in this example:

Excerpt 6: Excerpt from field notes, Freya afterschool staff, session 2.

The unit was divided into groups in April, and given a group assignment to the next session in August. They all return without having done it.
Researcher: How come none here has been able to do the assignment, it's been more than three months?
The group is quiet. Finally caretaker 1 speaks: Well, it's been so much with starting school and all.
Researcher: But you had plenty of time last semester, and all of you have worked during summer, haven't you?
Caretaker 2: I had to change my class so I haven't had the opportunity, they were a new group of kids.
Researcher: But this was after summer, wasn't it? You had plenty of time doing it with your former group, no? I'm just curious. That someone has had too much to do or had some unfortunate things happening, preventing doing the assignment – that happens. But all of you? What can explain it?
Vice principal: Well, you know, you get time for reading and doing the assignments and we are investing in this development program. It's pivotal that you really do your work, it's part of your employment and important if you are to be seen as professional.
After a long silence caretaker 3 says: Well, I think we might have thought that we had plenty of time and maybe we didn't prioritize */the others nod/*.
Researcher: So how are you going to do it differently the next time?

Excerpt 5 and 6 also points at the researcher's important role-modelling, to nurture and demand rigorous intellectual work in the presentations, and to the principal's clarifying role.

Conclusions

The design of a development program is important. Research shows that it often is hard to change or develop teachers, because of the complexity of teaching (Joyce & Calhoun, 2010, Shulman, 2004, Willingham, 2009). Timperley (2011) suggests a circular development process, where teacher development starts in considering the students' learning, and then goes on to focus teacher's needs and knowledge. During the successful programs, this was met by focusing student observations in the beginning. However, the successful programs quickly went on to focus planning and assessing, and used these areas for assignments and for trying out new methods. Timperley's circle was thereby making a turn in between every session.

An ideal model for developing the cognitive content in schools and afterschools

The research questions have been answered. Most teachers and caretakers changed their teaching style from addressing less cognitive content to addressing higher cognitive content. Depending on their teaching style we also know how different styles changed their planning and classroom activities after having participated in a development program, see figure 1.

We can also say something about what methods, or at least components, seem to be more effective than others: The impact on teachers' behavior in the classroom increased when the teachers were required to try out different ways to act, when they were required to present their experiences and get feedback from colleagues, researcher and leaders on what they had done and how, when the teacher read theoretical texts connected to what was lectured and tested and the texts were discussed with colleagues, and when the (vice) principal took active part during the program.

The importance of creating a learning community is pointed out by other researchers (cf. Bjørndal 2005; Joyce & Calhoun, 2010). In the successful projects here, implementation of the learning community culture seems to have been accomplished by three strong factors:

- Introducing mandatory assignments to be tried out with students, and presented in auditorium to researcher, colleagues, and principal for feedback and open, reflective dialogue. This led to transfer of experience and to broaden the discussion, but it also put a pressure on the participants to do the assignment, especially in the beginning of the program, when the inner motivation sometimes was lower.

- Nurturing and demanding rigorous intellectual work in the presentations, the feedback, and by reading research literature. Here, the researcher had to act as a role-model, especially in the beginning.

- The participation of the principal or vice principal giving the work legitimacy and importance.

An 'ideal type', a model of a successful development program, constructed from the results and analysis now takes its form. This model might be used for designing or evaluating teacher development programs, where the aim is to change teaching practice to address higher cognitive outcomes. The important components of the ideal model are represented in table 7, where a comparison to the results in the participating units in this research is shown.

Table 7. Components of the ideal teacher development program on teaching cognition, compared to the results in the participating units.

Components of the ideal type	**Addressed in the following participating units**	
	Units with successful development programs	Units with less or non-successful development programs
Length (1,5 year+) and number of sessions (8+) decided from the groups educational background and/or level of cooperation.	All	Lime, Indigo, Violet
Mandatory assignments where participants try out a new idea, method, or approach in an area that the group chooses, and discussed and improved in auditorium.	All	Red, Lime
Feedback on assignments and group dialogue is focused on connecting theory and practice, and showing and explaining why some methods are more effective than others.	All	Red
A combination of lectures, reading and discussing research literature, and giving feedback on group assignments are introduced early in the process.	All	-
Research reading, lectures and assignment focus planning and assessing in the teaching area in question, after initial student observations.	All (later at Orange, but they had a longer process)	Red (Violet partly)
Researcher active as a role model in intellectual curiosity and rigor, open dialogue and questioning, using professional language, and planning sessions with the audience's cognition in mind.	All	Brown, Red, Lime (Indigo & Violet partly)
Leader present at all sessions, leading in-between workshops, prepared to clarify the aim and to support the program and its demands.	All (Mauve & Purple partly, Orange partly and fully the last year)	Red, Lime, Indigo partly
Leader and researcher are prepared to deal with problems, disagreements, or conflicts that might surface during the program.	All	Brown, Red

The comparison indicates that it is the combinations of the components that are important, not an isolated component.

The material indicates that teachers embracing the *common teaching style* will have fewer problems than teachers using the other styles of less cognitive content to change to the *scaffolding teaching style*. Here lies an interesting area for further research and development. How can teachers using the *laissez-fair*, *'moralistic'*, and *student investigative style* be supported to embrace the more complex and effective *scaffolding style*? Is it via the *common teaching style* as is implied in this work, or are there more effective ways?

References

Andersen, T. (1987). The Reflecting Team, Dialogue and metadialogue in clinical work. *Family Process* 26 (4), pp. 415-428.

Anderson, L. W. & Krathwohl, D. R. (ed.) (2001). *A Taxonomy for Learning, Teaching, and Assessing. A Revision of Bloom's Taxonomy of Educational Objectives.* New York: Pearson Education.

Andersson, G., Persson, A. (2002). *Coaching och handledning av grupper. [Coaching and Mentoring Groups]* Lund: Studentlitteratur.

Bjørndal R. P. (2005). *Det värderade ögat. [The Evaluating Eye]* Stockholm: Liber.

Bloom, B. S. (red.). (1956). *The Taxonomy of Educational Objectives. The Classification of Educational Goals.* Handbook 1: Cognitive Domain. New York: David McKay Company.

Brusling, C, Strömqvist, G. (2007). *Reflektion och praktik i läraryrket [Reflection and Practice in the Teaching Profession]* Lund: Studentlitteratur.

Campoy, R. (2005). *Case Study Analysis in the Classroom. Becoming a Reflective Teacher*. Thousand Oaks: Sage Publications.

Carlgren, I. (2011). Direkt och indirekt lärande i skolan [Direct and Indirect Learning in School] In: Jensen, M. (ed.) *Lärandets grunder – teorier och perspektiv. [The Fundamentals of Learning – theories and perspectives]* Lund: Studentlitteratur, pp. 121-136.

Carlgren, I. (ed.) (1999). *Miljöer för lärande. [Contexts for learning]* Lund: Studentlitteratur.

Chetty, R., Friedman, J. N. & Rockoff, J. E. (2011). The Long-Term Impact of Teachers: Teacher Value-Added and Student Outcomes in Adulthood. *National Bureau of Economic Research Working Paper* No 1. 176999.

Cordingley, P, Bell, M, Thomason, S, Firth, A. (2005). The Impact of Collaborative Professional Development (CPD) on Classroom Teaching and Learning. *Research Evidence in Education*. London: Routledge.

Dysthe, O, Hertzberg, F, Løkensgard Hoel, T. (2002). *Skriva för att lära. [Writing to Learn]* Lund: Studentlitteratur.

Einarsson, C, Hammar Chirac, E. (2002). *Gruppobservationer. Teori och praktik. [Group Observations. Theory and Practice]* Lund: Studentlitteratur.

Ekman, G. (1999). *Från text till batong. Om poliser, busar och svennar. [From text to truncheon. About polices, ruffians, and commons]* D. diss. Handelshögskolan Stockholm.

Gardner, H. (2009). *Five Minds for the Future.* Massachusetts: Harvard Business School Publishing.

Guskey, T. R. (1995). Professional Development in Education. In Search of the Optimal Mix. In: Guskey, T. R, Huberman, M. (ed.) *Professional Development in Education.* New York: Teacher's College Press, pp. 114-131.

Gustavsson, L. (2008). *Att bli bättre lärare. Hur undervisningsinnehållets behandling blir till samtalsämne lärare emellan. [To Become a Better Teacher. How Educational Content Becomes Teacher Dialogue]* D diss. Umeå University.

Hargreaves, A. (2007). *Läraren i det postmoderna samhället [Teacher in the Post-modern Society]* Lund: Studenlitterartur.

Hargreaves, A. (1995). Development and Desire: A Postmodern Perspective. In: Guskey, T. R, Huberman, M. (ed.) *Professional Development in Education.* New York: Teacher's College Press, pp. 9-34.

Hattie, J. (2009). *Visible Learning.* London: Routledge.

Hetland, L., Winner, E., Veenema, S., Sheridan, K. M. (2007). *Studio Thinking. The Real Benefits of Visual Arts Education.* New York: Teacher College Press.

Holmqvist, M. (2006). *Lärande i skolan. Learning study som skolutvecklingsmodell. [Learning in School. Learning Study as a School Development Model]* Lund: Studentlitteratur.

Huberman, M, Gyskey, T. R. (1995). The Diversity of Professional Development. In: Guskey, T. R, Huberman, M. (ed.) *Professional Development in Education.* New York: Teacher's College Press, pp. 269-276.

Jensen, E. (2005). *Teaching with the Brain in Mind.* Alexandria: ASCD.

Joyce, B, Calhoun, E. (2010). *Models of professional Development. A Celebration of Educators.* Thousand Oaks: Corwin Sage.

Lauvås, P; Hofgaard, L, Handal, G. (1997). *Kollegahandledning i skolan [Collegial Mentoring in School]* Lund: Studentlitteratur.

Lewis, C. C., Hurd, J. (2011). *Lesson Study Step by Step: How teacher learning communities improve instruction.* Portsmouth: Heinemann.

Marton, F., & Booth, S. (2000). *Om lärande. [About Teaching]* Lund: Studentlitteratur.

Mitchell, E. W. (2005). *The Influence of Beliefs on the Teaching Practices of High School Teachers.* D. diss. University of Massachusetts, Amherst.

Mouwitz, L. (2001). *Hur kan lärare lära? Internationella erfarenheter med fokus på matematikutbildning. [How can teachers learn? International Experiences Focusing Mathematic Education]* NMC-rapport 2001:2. Göteborg University.

McKinsey & Company (2007). *How the world's best-performing school systems come out on top.* http://www.mckinseyonsociety.com. 2015-06-11.

PIRLS 2011: Läsförmågan hos svenska elever i årskurs 4 i ett internationellt perspektiv. [Reading ability among Swedish students in grade 4 in an international perspective] Stockholm: Skolverket.

PISA 2012 results: What Students Know and Can Do: Student Performance in Mathematics, Reading and Science (Volume I). Paris: OECD.

Pihlgren, A. S. (2011b). *Att finna en fritidshemmets didaktik. [Finding the Didactics of Afterschool Pedagogy]* Paper presented at the Nordic Subject Didactic Conference NOFA 3 2011, Karlstad University, Sweden, www.igniteresearch.org/library/.

Pihlgren, A. S. (2014). *Complementary Education in Classrooms and Afterschools.* Paper presented at the TA, Teachers Approach Conference, 2014. Riga, Lettland, www.igniteresearch.org/library/.

Pihlgren, A. S. (2013c). *Det tänkande klassrummet. [The Thinking Classroom]* Lund: Studentlitteratur.

Pihlgren, A. S. (2004). *Lönekriterier och feedback, bedömning av pedagogers kunskap och kompetens. [Salary Criteria and Feedback, Assessment of Pedagogues' Knowledge and Competence]* Stockholm Teacher Education, www.igniteresearch.org/library/.

Pihlgren, A. S. (2013a). *Planning for Thinking and Cognitive Development of Students.* Paper presented at the 5th International Conference of Cognitive Science ICCS 2013 in Tehran, Iran, www.igniteresearch.org.

Pihlgren, A. (2013b). Principals cooperating to assess classroom practice. Paper presented at the International Conference on Thinking, ICOT, January 2015 in Wellington, New Zeeland, www.igniteresearch.org/library/.

Pihlgren, A. S. (2008). *Socrates in the Classroom. Rationales and effects of philosophizing with children*. D.diss. Pedagogical Institution, Stockholm University.

Pihlgren, A., Fröman, H. (2009). *Socratic Group Leadership Mentoring.* Paper presented at the 14th International Conference on Thinking 2009 in Kuala Lumpur, Malaysia, www.igniteresearch.org/library/.

Pihlgren, A. S. (2011). *Thoughtful Dialogue in Relation to Other Instructional Methods*. Paper presented at the 15th International Conference on Thinking, ICOT 2011, Belfast, Ireland. www.igniteresearch.org/library/.

Roberts, J. E. (2012). *Instructional Rounds in Action.* Harward: Harward Education Press.

Sandberg, J., Targama, A. (1998). *Ledning och förståelse*. *[Leading and understanding]* Lund: Studentlitteratur.

Shulman, L. S. (2004). *The wisdom of practice: Essays on teaching, learning, and learning to teach*. San Francisco: Jossey-Bass.

Skolverket [Swedish National Agency for Education] (2014c). *Forskning för klassrummet. [Research for the Classroom]* Stockholm: Fritzes.

Skolverket [Swedish National Agency for Education] (2014a). *Grundskolan i internationella kunskapsmätningar – kunskap, skolmiljö och attityder till lärande. [Compulsory school in international knowledge assessment – knowledge, school context, and attitudes towards learning]* www.skolverket.se, 2014-06-14.

Skolverket [Swedish National Agency for Education] (2014b). *Elever och personal i fritidshem hösten 2013. [Students and staff in after school activities autumn 2013]* www.skolverket.se, 2014-06-22.

Skolverket [Swedish National Agency for Education] (2007). *Kvalitet i fritidshem, Allmänna råd och kommentarer. [Quality in leisure-time centers, General advise and comments]* www.skolverket.se, 2014-06-24.

Smylie, M. A. (1995). Teacher Learning in the Workplace. In: Guskey, T. R, Hunerman, M. (ed.) *Professional Development in Education.* New York: Teacher's College Press, pp. 92-113.

Sokol, A. (2012). Towards Helping Teachers Introduce Thinking in the Classroom. Presentation at TA, Teachers Approach Conference 14-15 September, 2012: Bringing Creativity and Thinking Skills into the Education Process. Riga, Lettland.

Svedberg, L. (2003). *Gruppsykologi, Om grupper, organisationer och ledarskap [On Groups, Organizations, and Leadership]* Lund: Studentlitteratur.

Tillema, H. H, Jeroen, M. I. (1995). Training for the Professional Development of Teachers. In: Guskey, T. R, Huberman, M. (ed.) *Professional Development in Education.* New York: Teacher's College Press, pp. 135-180.

TIMMS 2011. Svenska grundskoleelevers kunskaper i matematik och naturvetenskap i ett internationellt perspektiv. [Swedish compulsory students' knowledge of mathematics and natural science in an international perspective] Rapport 380. Stockholm: Skolverket.

Timperley, H. (2011). *Realizing the Power of Professional Learning.* Open University Press.

Timperley, H, Wilson, A, Barrar, H, Fung, I. (2007). *Teacher Professional Learning and Development: Best Evidence Synthesis Iteration.* Wellington, Ministry of Education.

Vedung, E. (2009). *Utvärdering i politik och förvaltning. [Evalutation in Politics and Administration]* Lund: Studentlitteratur.

Vedung, E, Dahlberg, M. (2013). *Demokrati och brukarutvärdering*. *[Democrazy and User Surveys]* Lund: Studentlitteratur.

von Oppel, M, Aldridge, J. (2015). *Education Reform in Abu Dhabi – What holds Teachers Back? Factors affecting teachers in their implementation of education reform initiatives.* Paper presented at the International Conference on Thinking, ICOT, 1st of July 2015, in Bilbao, Spain.

Wiggins, G. (1998). *Educative Assessment. Designing Assessments to Inform and Improve Students' Performance.* San Francisco: Jossey-Bass.

Willingham, D. T. (2009). *Why don't Students Like School? A cognitive scientist answers questions about how the mind works and what it means for the classroom.* San Francisco: Jossey-Bass.

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Ann S. Pihlgren, PhD, research director, researcher, and educator at Ignite Research Institute, has worked as supervisor, principal, teacher, quality controller, and chairman of the political school board in the Swedish school system. She is involved in several projects concerning school development, pedagogical improvement, and leadership training, in Sweden, Europe, and the USA. Her doctorial dissertation "Socrates in the Classroom" was a thorough investigation of the Socratic traditions in education, and a phenomenological analysis of the interplay of youngsters philosophizing as part of their classroom syllabus. It was awarded "Swedish dissertation of the year" 2008. Ann has also received the Swedish award for enhancing school democracy, DAKS. Her literary book production includes: "Socratic Dialogue in Education", "Democratic Educational Methods", and "The Thinking Classroom". She is the editor of the anthologies "The Leisure-time Center" and "The Didactics of Afterschool Education", and has also participated in: "Leisure-time Pedagogy", "Educational Assessment", "Dewey Read Today", "Knowledge, Communication, and Assessment in Education", and in several international journals. Her research interests concern thinking, cooperative learning, democratic education, and consequences in teaching. Ann is the international board member of "The National Paideia Center". She is at the moment involved in two school development projects in Sweden for the Swedish National Agency of Education concerning reading for understanding and national advice for after-school activities, and she has cooperated with universities in Belgium, Norway, other European countries, and in Iran.

Short bibliography

Some articles and books:

Pihlgren, A. S. (2008): Socrates in the Classroom. Rationales and Effects of Philosophizing with Children. Stockholm University: Elanders.

Pihlgren, A. S. (2010). *Sokratiska samtal i undervisningen*. [Socratic dialogues in Education] Lund: Studentlitteratur.

Pihlgren, A. S. (2013). Det tänkande klassrummet. [The Thinking Classroom] Stockholm: Liber.

Pihlgren, A. S. (2012). *Demokratiska arbetsformer – värdegrundsarbete i skolan.* [Democratic Educational Methods- Teaching Fundamental Values in School.] Lund: Studentlitteratur.

Pihlgren, A. S. (ed.) (2013). *Fritidshemmets didaktik. [The Didactics of Afterschool Education]* Lund: Studentlitteratur.

Pihgren, A. S. (ed.) *Fritidshemmet och skolan – det gemensamma uppdraget. [Afterschool and School – the Shared Mission].* Lund: Studentlitteratur.

Pihlgren, A. S. (2013a). *Planning for Thinking and Cognitive Development of Students. Paper presented at the 5th International Conference of Cognitive Science ICCS 2013 in Tehran, Iran.*

Pihlgren, A. S. (2011a). Thoughtful Dialogue in Relation to Other Instructional Methods. *Paper presented at the 15th International Conference on Thinking,* ICOT 2011, Belfast, Ireland. www.kunskapskallan.com 2013-03-25.

Pihlgren, Ann S, Rohlin, Malin (2013). The ”Free” Child – Organized After School Activities as the Upbringing of a Community In: B. Boufoy-Bastick (ed.) *The International Handbook of Cultures of Educational Policy*. *Comparative International Issues in Policy-Outcome Relationships. Volume one. Achievement with Family & Community Involvement.* Strasbourg: Analytrics, pp. 437-477.

Pihlgren, A. S. (in press). *Student Led Parent Conferences – An Evaluation*. Brno: Studia Paedagogica.