Improving Teaching and Learning Together

A Literature Review of Professional Learning Communities

David Olsson

Faculty of Arts and Social Sciences

Education

RESEARCH REPORT | Karlstad University Studies | 2019:23

Improving Teaching and Learning Together

A Literature Review of Professional Learning Communities

David Olsson

RESEARCH REPORT | Karlstad University Studies | 2019:23

Improving Teaching and Learning Together - A Literature Review of Professional Learning Communities

David Olsson

RESEARCH REPORT

Karlstad University Studies | 2019:23

urn:nbn:se:kau:diva-74279

ISSN 1403-8099

ISBN 978-91-7867-042-0 (print)

ISBN 978-91-7867-047-5 (pdf)

Studier i de samhällsvetenskapliga ämnenas didaktik nr 36

© The author

Distribution:
Karlstad University
Faculty of Arts and Social Sciences
Centre for the Studies of Social Sciences Didactics
SE-651 88 Karlstad, Sweden
+46 54 700 10 00

Print: Universitetstryckeriet, Karlstad 2019

WWW.KAU.SE

Table of Contents

Preface

This literature review forms part of the Swedish government funded project *Utbildning, Lärande, Forskning* (*Education, Teaching, Reseach, my translation*), which is coordinated by Karlstad University in cooperation with Gothenburg University, Umeå University, and Uppsala University. The purpose of the project is to develop and test models that could promote long term cooperation for practice-based research between academia and Swedish schools. The duration of the project is from 2017 to 2021 (Swedish Ministry of Education 2017).

The initiative to carry out this literature review was taken by the Center for Social Science Didactics (CSD) at Karlstad University. The review focuses on professional learning communities (PLCs) and how they can function as an infrastructure for promoting practice-based research that improves teaching practices and student learning in the school subjects of the Swedish primary and secondary school system. The reviewed research has been published in peer reviewed English-speaking journals as well as in books. Based on this research, the report presents findings demonstrating the benefits of PLCs and identifies the defining characteristics of these PLCs. Moreover, it provides a research informed discussion with suggestions of ways to promote a PLC infrastructure facilitating practice-based research, in the form of various types of collaborative inquiry, as well as the circulation of such practice-based knowledge. The suggestions presented in this discussion are tentative and thus form part of the ULF project's objective to develop models promoting long-term cooperation for practice-based research. These suggestions could inform future research with ambitions to test and further develop such models.

Finally, I would like to thank my colleagues at CSD for providing valuable input and support during the process of working with this literature review. I especially want to thank Martin Kristiansson, Kenneth Nordgren and Ulrik Holmberg. I also want to thank Johan Samuelsson and Ann-Christin Randahl for their thorough reading of

the entire manuscript and for their constructive critique which helped improve the final version of this report.

David Olsson, August 2019

1 Introduction

Teachers' competence in teaching is a key factor affecting students' learning chances (Barber and Mourshed 2007; Wang 2015). Accordingly, the development of that competence is an important part of improving students' learning opportunities. Research has identified teacher collaboration as essential in this regard (e.g. Carpenter 2017; Jarl et al. 2017; Nelson and Slavit 2007; Stoll et al. 2006; Vescio et al. 2008), especially teacher collaboration focused on the connection between the development of teaching practices and student learning (Vescio et al. 2008), and that is enriched by collaboration with researchers (Cordingley 2015). By contrast, student learning tends to be significantly lower in schools where teachers work in isolation (Jarl et al. 2017). Hence, to enhance students' learning chances, it is critical to develop and sustain this type of teacher-teacher and teacher-researcher collaboration, and to counteract isolationist school cultures and teaching.

The importance of promoting this type of collaboration puts the spotlight on professional development practices. Many professional development practices have been criticized for being inadequate in that they do not promote professional development that leads to changes in teaching practices and, related to this, do not improve student learning. First, there are findings suggesting that much of the professional development is not carried out in connection to teachers' teaching practices. An example of this is professional development in the form of sporadic seminars, in which teachers are informed about a new teaching method and each teacher is expected to implement this method when appropriate. That is, the process of translating the method into practice is individualized; it is largely up to each individual teacher to figure out how to apply the new knowledge. Related to this, this type of professional development is based on a traditional knowledge transfer model where experts provide the knowledge and teachers are to consume that knowledge. The process of translating the new knowledge into the classroom setting is not subject to inquiry, but left as a "black box". This can be contrasted to collaborative and inquiry-based professional development practices, in which a group of teachers together, at times in collaboration with a

researcher, inquire into the translation process on how to teach a subject matter, relate and incorporate the new knowledge with their teaching practices, and assesses the impacts these changes have on student learning (Borko 2004; Darling-Hammond and Musanti 2017; Ndlovu 2011; Richardson 2009).

A second aspect of many current professional development practices is that they are not integrated in the school organization. Instead, introduction of new teaching methods and other forms of professional development are often limited to a few days a year, reserved for professional development. Consequently, these professional development activities become relatively fragmented compared to professional development that is integrated with the school organizations' everyday practices. In addition to being marked by a traditional knowledge transfer model, which black boxes and individualizes the translation of new teaching methods into teachers' actual practices, many current professional development practices are thus also criticized for not being integrated in the school organizations' regular activities (Borko 2004; Darling-Hammond and Richardson 2009; Musanti 2017; Woodland 2016).

The emphasis on encouraging teacher-teacher and teacher-researcher collaboration as a way of improving student learning, and the critique of many current professional development practices, forms a backdrop for much of the research underscoring that there is a need for another type of professional development. This type of professional development should be integrated in the schools' organization, be based on collaborative inquiry (as a form of practice-based research), and be centered on developing teaching practices in ways that advance student learning. This type of professional development is often discussed under the umbrella term of professional learning communities (PLCs). Based on a review of previous research, this report introduces the reader to the PLC concept as a type of infrastructure that can form the basis for teachers' professional development in teaching the school subjects.

1.1 Purpose

The purpose of this review is to identify research findings demonstrating the benefits of PLCs and the characteristics of these PLCs. The purpose is also to provide a research informed discussion of how PLCs could be developed and sustained.

1.2 Scope

The main focus in this report is on PLCs as an infrastructure to promote teachers' subject-didactic professional development and, related to this, student learning in the school subjects. Moreover, although the report reviews research from many different parts of the world, it is primarily intended to be of relevance to the Swedish primary and secondary school system. This being said, much of the report is arguably of relevance to other school contexts as well.

1.3 Outline

The remaining part of this report is structured as follows. In Chapter 2 I present the methods used to retrieve the reviewed literature. In Chapter 3 I first present research findings demonstrating how PLCs can benefit teaching and learning. This is followed by a description of the key characteristics of the PLC concept. The rest of this chapter consists of a research informed discussion of how PLCs could be developed and sustained. Chapter 4 is a concluding summary of the report.

2 Methods

The literature that informs this review has been retrieved based on two information retrieval methods. The first method is inspired by techniques used in so-called systematic reviews (Petticrew and Roberts 2006). The first stage of using this method was to construct a Boolean search string[1] based on keywords relevant for this review. I identified these keywords through a preliminary reading of literature on practice-based research, school effectiveness research, school improvement research, and other related research fields,[2] as well as from a reading of a Swedish public inquiry. The public inquiry, *Forska tillsammans – samverkan för lärande och förbättring* (*Do research together – cooperation for teaching and improvement*, my translation) was issued to investigate how a stronger scientific base in the Swedish primary and secondary education system can be

1 The Boolean search string included the following keywords and operators: ("Educational Effectiveness Research" OR "School Effectiveness Research" OR "School Improvement Research" OR "professional Learning Communit*" OR "epistemic communit*" OR "Institutional profil*" OR infrastructure* OR "epistemic culture*" OR "school culture*" OR institutionali* OR "school-university collaboration" OR "school university cooperation") AND ("Practice-based research" OR "practice developing research" OR "praxis develop* research" OR "lesson stud*" OR "learning stud*" OR "action research" OR "development research" OR "design research" OR "design stud*" OR "design experiment*" OR "developmental research" OR "formative research" OR "formative inquiry" OR "formative experiments" OR "formative evaluation" OR "engineering research" OR "educational design research" OR "design-based research" OR "participatory action research" OR "design-based implementation research" OR "development studies" OR "validation studies" OR "research circle*" OR "action learning" OR "teaching-learning sequence*" OR "teacher research" OR "curricular development research" OR "practitioner-research" OR intervention OR "classroom research" OR enquiry OR inquiry OR "enquiry-based" OR "inquiry-based" OR "problem-based" OR "driving question" OR "teacher thinking")

This Boolean search string was not constructed specifically for retrieving research on PLCs, but for retrieving research on infrastructures that support practice-based research that, in turn, promotes teachers' professional development and students' learning chances. However, after having read the retrieved literature, I discovered that the relevant research almost exclusively focused on PLCs. Consequently, I made the choice to do this literature review about PLCs.

2 The research texts were Eklund (2011), Jarl et al. (2017), and Plomp and Nieveen (2013).

established. The inquiry introduces some of the literature on practice-based research and cooperative infrastructures and, accordingly, several of the central keywords in these research fields (Swedish Government Official Report 2018:19). In addition, I had a dialogue with research colleagues with an expertise in some of these research fields, which resulted in a few additional keywords being added to the Boolean string.

Second, the Boolean search string was used in the database ERIC (EBSCOhost's version), in which the search was limited to peer reviewed articles published from 2000 to 2018 (the search was carried out from June 19 to June 21, 2018). The search initially yielded 483 hits. The abstracts of these 483 articles were read with the purpose of excluding articles not relevant for this review. I used the following exclusion criteria as a basis for excluding irrelevant articles:

- All articles not focused on strategies or infrastructures for, or institutionalization or organization of, didactic/pedagogic models were excluded.
- All articles not focused on teachers' professional practices were excluded (examples of articles that were excluded on this basis were those focused on school nurses' practices).
- All articles not focused on primary or secondary schools were excluded, except for those with a focus on preservice teachers.
- All articles focused on country-specific issues without relevance for the Swedish educational context were excluded.

Finally, after having read the abstracts based on these exclusion criteria, 152 articles were deemed relevant for the purpose of this review. Unfortunately, I only had access to 120 of these articles. These 120 articles were read as a whole. After having read them, 24 additional articles were deemed irrelevant. Hence, the database search resulted in the inclusion of 96 articles.

The second method used for the information retrieval draws on the snowball selection technique (Esaiasson et al. 2012), which in this case means that I browsed the articles retrieved from the database search for additional research of relevance. I especially took notes of

researchers and research publications that recurred in the articles retrieved from the database search. The identification of references that reappeared in many or most of the articles retrieved from the database search helped me to identify key studies in this particular field of research, both books and articles. These were also added to the research literature reviewed in this report.

3 Findings and discussion

In this chapter I present the findings from the literature review and offer a discussion with tentative suggestions on how PLCs could be promoted. I first report research findings demonstrating how professional learning communities (PLCs) can benefit teaching and learning. This is followed by a description of the defining characteristics of PLCs. Finally, I provide a research informed discussion of how the development of PLCs could be established, cultivated, and sustained.

3.1 Benefits of professional learning communities

Research points to several benefits with advancing professional learning communities as an infrastructure for teachers' professional development. First, several studies show that students perform better in schools with functioning PLCs, as indicated by improved student learning (see Lomos et al. 2011; Stoll et al. 2006; Vescio et al. 2008). Second, there are studies demonstrating that teachers participating in a PLC perceive it as enhancing their professional development (see Stoll et al. 2006). Teachers have for example stated that engagement in PLCs have supported their own learning process (Carpenter 2017; Gee and Whaley 2016). There are also observations showing that teachers' have refined and developed new teaching practices while participating in PLCs. In other words, there are findings suggesting that the PLCs not only provide teachers with new knowledge and perspectives, but also support them in translating this knowledge into new teaching practices (Gee and Whaley 2016; Vescio et al. 2008). Third, there is research indicating that PLCs tend to enhance teachers' perception of their efficacy (Lakshmanan et al. 2011; Mintzes et al. 2013). Fourth, studies have found that the promotion of PLCs has the potential to incite change in entire school cultures, from isolationist to collaborative cultures (see Khourey-Bowers et al. 2005; Vescio et al. 2008; Woodland 2016).

3.2 Characteristics of professional learning communities

The concept "professional learning community" (PLC) started appearing in the research literature around 1990 (Bolam et al. 2005; Hopkins et al. 2014). Its roots can be traced to research on

organizational learning theory (Chen and Wang 2015; Wong 2010) and social constructivist theories on learning (Chen and Wang 2015; McConnel et al. 2013). The term PLC can be described as an umbrella term with no consensus as to its exact meaning, and it has been used to describe several forms of teacher collaboration, such as "communities of practice", "teacher collaborative communities", "learning teams", "learning communities", "professional learning networks" (Schneider et al. 2012), "problem-solving teams", "collaborative teacher teams", and "inquiry communities" (Tan and Caleon 2016). However, a few characteristics are included in most definitions (Bolam et al. 2005; Stoll et al. 2006; Tan and Caleon 2016; Taylor et al. 2014). For instance, a condensed definition often used in the research literature defines a PLC as:

> [...] a group of people sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented, growth-promoting way, operating as a collective enterprise. (Stoll et al. 2006, p. 223)

Stoll et al. (2006) also emphasize that learning in a PLC entails deconstructing knowledge and practices through inquiry processes marked by collaborative reflection and analysis, followed by peers collaboratively reconstructing the teaching practices to suit a specific context (Stoll et al. 2006). Another compressed definition describes the characteristics of a PLC as:

> [...] groups of individuals who: (1) engage in ongoing collaborative activities to identify and work towards common goals, (2) co-construct, share, and disseminate knowledge, and (3) share and reflect on individual practices. (Tan and Caleon 2016, p. 127)

Hence, although there are different definitions, a few core characteristics are recurring in the literature on PLCs, such as the sharing of teaching practices and collaborative inquiry processes in which analyzing, reflecting on, and improving teaching practices is key. Most researchers also emphasize that the development of teaching practices needs to be linked to assessments of student learning, with the goal of improving the latter (e.g. Allen 2013; Bolam et al. 2005; Bryk et al. 1999; Dufour and Fullan 2013; Nelson 2009; Richmond and Manokore 2011; Roy and Hord 2006; Sompong et al. 2015; Stoll et al. 2006). Based on my inventory of recurring properties included in the definitions of the PLC concept in the research

literature, the following defining characteristics are used to provide a more detailed definition of the key components of the PLC concept:

1) *Professional development as an integrated and ongoing part of the school organization*. Professional learning communities is a type of infrastructure for professional development that is integrated in the school organization and, as such, forms part of the organizational routines. In other words, professional development is ongoing and integrated in the school organization (Birenbaum et al. 2009; Lai et al. 2009; Musanti 2017; Vescio et al. 2008; Woodland 2016).

2) *The local school context as the point of departure*. In PLCs, teachers' knowledge and practices, and different challenges and opportunities that teachers face in their local school context, forms the starting point for professional development, not external demands (e.g. Allen 2013; Birenbaum et al. 2009; Birenbaum et al. 2011; Musanti 2017; Nelson and Slavit 2007; Pella 2011). Related to this, several studies emphasize the importance of a shared leadership structure, in which teachers are empowered as co-leaders in deciding the direction of teaching and learning development (e.g. Carpenter 2017; Roy and Hord 2006).

3) *Collaborative and reflective inquiry*. Meeting with peers on a regular basis to critically assess, reflect upon, and develop teaching practices, with the goal of improving students learning outcomes, is at the very core of the notion of PLCs. It is recurrently emphasized that the focus should not be limited to developing teaching practices; these practices needs to be assessed in relation to student performance, where improving the latter is at the center stage (e.g. Attorps and Kellner 2017; Bolam et al. 2005; Darling-Hammond and McLaughlin 2011; Hipp et al. 2008; Roy and Hord 2006; Stoll et al. 2006; Taylor et al. 2014; Vescio et al. 2008). This form of inquiry is premised on teachers "opening up their classrooms" and sharing their teaching practices, enabling peers to observe and assess each other's practices (Aubusson et al 2007; Bolam et al. 2005; Bond

2013; Botha 2012; Bryk et al. 1999; Carpenter 2017; Roy and Hord 2006; Stoll et al. 2006),[3] testing and assessing new practices, and observing and analyzing the outcomes on student performance (Carpenter 2017).[4]

4) *Forming a shared vision and goals for students learning*. Reaching agreements on a shared vision and on learning goals are described as crucial for PLCs. The argument is that such agreements are needed in order to work towards the same learning goals when seeking to improve students' learning outcomes (e.g. Allen 2013; Bolam et al. 2005; Botha 2012; Dufour and Fullan 2013; Nelson and Slavit 2007; Roy and Hord 2006; Stoll et al. 2006; Taylor et al. 2014).[5]

5) *Collective responsibility for students learning outcomes*. In PLCs, teachers and the school leadership hold collective responsibility for improving students' chances of attaining the learning goals agreed upon (e.g. Botha 2012; Dufour and Fullan 2013; Stoll et al. 2006). It has been stressed that collaboration between the teachers and the school leadership at both a

---

3 It has been emphasized that these observations of teaching practices are always limited to representations of practice, which is a selective process that is further filtered through interpretation. This both creates opportunities and limitations to the development of teaching practices (see Little 2003).

4 As highlighted in some research, especially research with a micro-political perspective, critical inquiry processes also tend to be marked by conflict over values, i.e. it is probable that different perspectives and values will meet and possibly clash during an inquiry process. Hence, questions of power and influence over the process becomes important as well, such as who advocates a problem? Why? Which actors are the most influential? Why? Hence, "[t]eachers in PLCs must navigate not only the inquiry process itself, but the players involved in shaping what should be addressed, why, and how" (LeChasseur et al. 2016, p. 258).

5 The focus on promoting a shared vision and goals for student learning has received criticism for neglecting its tendencies to reproduce current power structures and inequalities (see Giannakaki et al. 2018). This tendency is arguably worth considering and actively seeking to counteract in initiatives to develop PLCs.

> strategic and operative level favors the development of a culture of collective responsibility (Botha 2012).

Although these characteristics are commonplace in much of the research literature, the term professional learning community has become something of a buzzword outside of academia, where it is used to describe many different types of phenomena (Roy and Hord 2006; Taylor et al. 2014). Because of this, some researchers' have distinguished between strong and weak PLCs. Definitions of strong PLCs largely mirrors the academic definitions of PLCs, as in the following definition in which they include:

> [...] members with shared values and expectations linked to teaching, learning, and the teacher role; a focus on promoting improvement in student achievement; sharing of expertise through collaboration; sharing of practice through observation and coaching; and reflection that is based on dialogue and examination of assumptions around quality practice. (Piggot-Irvine 2006, p. 4)

Strong PLCs are contrasted to weak PLCs, which are characterized by features such as: a low degree of shared expectations; a culture of congeniality among the involved teachers rather than critical collaborative deconstruction and reconstruction of teaching practices; forms of cooperation not challenging norms of isolationist teaching practices, for example not contesting school cultures in which "closed classrooms" are the norm (Piggot-Irvine 2006). Related to this distinction, there is research stressing that the existence of formal teaching teams and other types of PLCs is no guarantee for the presence of collaborative inquiry focused on improving teaching practices and student learning (Attorps and Kellner 2017; Carpenter 2017).

In terms of organizational scope, the PLC concept is used quite broadly in the research literature. In some research, a PLC is described as a collaborative organizational arrangement that comprises entire schools, while other research use the concept for specific subject or grade-level teams (LeChasseur et al. 2016). These descriptions can be limited to processes at one school (e.g. Svanbjörnsdottír et al. 2016a), include several schools (D'Ardenne et al. 2013; Darling-Hammond and McLaughlin 2011; Snow-Gerono 2005), or come in the form of clusters of within and between school

PLCs (Lai et al. 2009*)*. Examples of PLCs that stretch beyond a specific school are virtual or online PLCs involving teachers from several schools (Francis and Jacobsen 2013; Hodes et al. 2011; Holligan 2006; Holmberg 2017; McConnell et al. 2013) and PLCs developed through school-university partnerships (Darling-Hammond and McLaughlin 2011; Nehring and O'Brien 2012).[6] The PLC concept has even been used to describe initiatives with the stated intentions to improve collaboration between principals from different schools as a part of promoting system-wide change across schools (Naicker and Mestry 2015; Piggot-Irvine 2006). PLCs such as these have had the specified purpose of improving conditions for student learning by promoting collaboration and counteracting isolation at the schools (Naicker and Mestry 2015).

In the research literature, there are also studies of PLCs focusing on different types of problems. Depending on their focal area, the membership structure in these PLCs tends to differ. Some PLCs are developed for broad school reform and therefore include many different types of staff, such as the principal(s), teacher representatives, and other school staff. Other PLCs focus on relatively broad pedagogical issues, stretching across the disciplinary boundaries of the school subjects. These PLCs are usually organized around specific classes or students, and/or include teachers from different disciplines teaching these students (Darling-Hammond and McLaughlin 2011). An example of this is PLCs inquiring on how to integrate technology in teaching (Hughes et al. 2005). Finally, some PLCs are centered on developing teaching and learning within specific school subjects, and are thus comprised of teachers teaching the same subject, for instance history, science, or social science (Darling-Hammond and McLaughlin 2011; Richmond and Manokore 2011). A research informed discussion of how the latter type of PLC could be promoted constitutes the focal point in the remaining part of this chapter. The argument is that an infrastructure supporting collaborative subject didactic professional development should be

6 There are even examples of game-based professional situated training mirroring the PLC format (see Vrasidas and Solomou 2013).

promoted since research indicates that this would improve students' learning outcomes in the school subjects (see Attorps and Kellner 2017; Bausmith and Barry 2011; Lomos et al. 2011; Vescio et al. 2008). Moreover, recent empirical evidence suggest that this type of collaborative infrastructure is currently underdeveloped in the Swedish primary and secondary school system (Nordgren et al. 2019), which is the school context that is of particular interest to this report.

3.3 Promoting professional learning communities

In this part of the report, I provide a research informed discussion with tentative suggestions of how to promote a PLC infrastructure that supports the development of teachers' subject didactic knowledge and practices and, consequently, student learning in specific school subjects. I start with a discussion of how different types of practice-based knowledge, produced through collaborative inquiry (as a form of practice-based research), could be combined to advance and improve subject-didactic professional knowledge. Subsequently, I describe four different types of measures that could support the construction of a PLC infrastructure for developing and sustaining such professional knowledge.

3.3.1 Different types of knowledge

In the literature, different ways of classifying knowledge are discussed. I find two typologies particularly useful. The first categorizes knowledge into the following three types: mode 1 knowledge, mode 2 knowledge, and public practice-based knowledge (Enthoven and de Bruijn 2010). The second typology also categorizes knowledge into three types, i.e. knowledge-for-practice, knowledge-in-practice, and knowledge-of-practice. In many respects, these two typologies mirror each other. The main difference between them is that knowledge-of-practice has an explicit emancipatory objective (Cochran-Smith and Lytle 1999; Nelson 2009), which is not the case for public practice-based knowledge. In what follows the meaning of the different types of knowledge will be detailed.

Mode 1 knowledge is formal scientific knowledge. This knowledge tends to be quite abstract and difficult to translate into teaching practices (Enthoven and de Bruijn 2010). Cochran-Smith and Lytle

(1999) and Nelson (2009) portrays this type of knowledge, which they label knowledge-for-practice, as characterized by a division of labor between researchers and teachers in which researchers produce knowledge and teachers consume it. It is thus based on a knowledge transfer model where teachers are expected to translate and implement generic and relatively abstract knowledge into their teaching practices. In other words, teachers should become competent consumers of knowledge.

The second type of knowledge, mode 2 knowledge, is developed in and for a specific context, either by teachers or through collaborative practice-based research involving both teachers and researchers (Enthoven and de Bruijn 2010). Cochran-Smith and Lytle (1999) and Nelson (2009) labels this knowledge-in-practice – a term that points to the focus of this type of knowledge production. This knowledge is developed with the purpose of being relevant for a specific school context. However, since it is developed for a specific context, its relevance, usefulness, and circulation beyond that context is generally not considered. Although more general principles and lessons could often times be drawn from this form of practice-based research, mode 2 knowledge or knowledge-in-practice tend to have a very limited reach.

As previously mentioned, definitions of PLCs include the notions that knowledge should be situated in school contexts and be developed collaboratively. This means that involvement in a PLC entails that knowledge described as mode 2 knowledge and knowledge-in-practice is one type of knowledge that should be developed. To enable this, there is research highlighting the importance of external support through mentorship and coaching, at least at the early stages of PLC development. It is suggested that this could be provided through university-school partnerships and other forms of collaboration between researchers and teachers, where researchers often take on a facilitating and mentoring role. This support is described as crucial for developing teachers' capacity to lead critical inquiry processes – processes that advance teaching practices that, through empirical testing, are shown to improve student learning in a specific school

context (e.g. Chow et al. 2015; Nelson and Slavit 2007; Svanbjörnsdóttir et al 2016a; Wennergren 2016).

The third type of knowledge, public practice-based knowledge, is practical knowledge that is relevant and shared beyond a specific school context. The wider circulation and relevance of this knowledge can be contrasted to the narrow scope of the practical knowledge described as mode 2 knowledge or knowledge-in-practice. Public practice-based knowledge is also produced through collaborative practice-based research, but this research is focused on creating more generic practical knowledge. Hence, it is practical knowledge that provides new perspectives, concepts, frames etc. This knowledge has the potential to support more reflective and theoretically informed inquiry processes across schools since it has relevance beyond a specific context but nevertheless is grounded in practice (Enthoven and de Bruijn 2010). Cochran-Smith and Lytle (1999) and Nelson (2009) use the label knowledge-of-practice to describe a type of knowledge that in many ways resembles public practice-based knowledge in that it is produced through practice-based research and is assumed to be relevant beyond specific contexts. However, a key difference is that knowledge-of-practice has emancipatory objectives, i.e. it explicitly has a norm critical focus.

The promotion of PLCs facilitating practice-based research with a focus on creating public practice-based knowledge and knowledge-of-practice is arguably also important. This type of knowledge, for which research institutions can play a key facilitating role (as elaborated below), could open up for the establishment of a broader knowledge community of teachers, researchers, and other actors. Such community could allow for more wide-spread knowledge flows that open up new perspectives that support reflection and transformation of current teaching practices in ways that benefit student learning. In fact, some research even makes the claim that

> [...] professional learning conversations that focused simply on analysing current practice and those not rooted in evidence from experimenting with new approaches were not linked with benefits for students. (Cordingley 2015, p. 242)

My argument is that PLCs facilitating the production and wider flows of public practice-based knowledge and knowledge-of-practice would benefit such experimentation with new approaches.

Drawing on discussions in research (particularly Cochran-Smith and Lytle 1999; Enthoven and de Bruijn 2010; Nelson 2009), I thus suggest that a PLC infrastructure should be constructed to support the production of public practice-based knowledge, knowledge-of-practice, and knowledge-in-practice/mode 2 knowledge. My argument is that more generic practical knowledge is important for the broader development of subject didactic teaching, while knowledge-in-practice/mode 2 knowledge is needed to support more context-specific aspects of teaching and learning.

Drawing on Capobianco and Feldman (2006) and Peurach and Glazer (2016), I suggest that two types of communities could be useful in supporting a PLC infrastructure for these different types of knowledge. Knowledge-in-practice could be developed in a PLC format termed community of practice. Knowledge-of-practice and public practice-based knowledge could be circulated and developed through epistemic communities.

The development of practice-based knowledge for specific contexts, i.e. mode 2 knowledge or knowledge-in-practice, is captured by the logic of communities of practice, which can be described as a type of PLC centered on developing local teaching practices and student learning through collaboration in relatively small groups (Capobianco and Feldman 2006; Lave and Wenger 1991; Peurach and Glazer 2016). During the development of these PLCs, this type of knowledge production could be supported by researchers, for instance through action research in which researchers help facilitate collaborative inquiry where teachers assess and develop localized teaching practices to improve student learning (Capobianco and Feldman 2006; Wennergren 2016). There are also a number of methods that could be used to support the development of collaborative inquiry, such as critical friend groups (Norman et al. 2005; Wennergren 2016), protocols (Allen 2013; Norman et al. 2005; Wood 2007), learning studies (Attorps and Kellner 2017; Tan and Caleon 2016), and lesson

studies (Chassels and Melville 2009; Gee and Whaley 2016; Pella 2011).

The logic and structure of the epistemic community is suitable for developing and sustaining flows of public practice-based knowledge and knowledge-of-practice. Epistemic communities have been described as "[…] capable of creating and warranting knowledge that is believable and trustworthy to others outside of the local group" (Capobianco and Feldman 2006, p. 505). This knowledge could support and enrich collaborative inquiry in local PLCs (communities of practice). As mentioned, research emphasizes that more generic knowledge can *support* collaborative inquiries in PLCs. However, these inquiries should be driven by the context specific experiences at each school (see section 3.2). This has for instance been discussed in terms of data-supported inquiry in contrast to data-driven inquiry (Anderson and Herr 2011). Accordingly, knowledge and tools circulated through epistemic communities should be used to support reflection and renewal within the communities of practice, but they should not be the primary drivers of the locally produced knowledge-in-practice.

Considering the type of knowledge developed and circulated through epistemic communities, these communities preferably involves many more actors than a community of practice; it is desirable that epistemic communities include actors from several organizations operating in different locations (Capobianco and Feldman 2006; Peurach and Glazer 2016). As with epistemic communities in general, the subject didactic knowledge developed and circulated through them could include three key components: (i) development of "theory", which is defined as negotiated and shared cognitive frames; (ii) "code", i.e. coding schemes and other symbolic means of expression and; (iii) "tools", which is physical artifacts with embedded technology (Peurach and Glazer 2016). Translated to subject didactics this could for instance mean that conceptual knowledge (see Ion and Iucu 2014; Jones and Moreland 2005) is developed in ways that relate to all three components of an epistemic community listed above. Conceptual knowledge development in subject didactics,

corresponding to “theory”, is important since it is imperative that teachers have competence to

> […] organize their work around the most abstract and coherent principles that characterize a particular domain of knowledge. These principles are the core conceptual tools, the internalization of which enables students to think powerfully about a whole range of phenomena. This means that teachers need to have a sense of what the nature of the discipline is, understanding its organizing concepts as well as its tools. (Jones and Moreland 2005, p. 195)

Different epistemic communities could be used to support the circulation and development of didactic models with different purposes regarding the type of content knowledge they are designed to advance. One epistemic community could for instance be developed for didactic knowledge concerning teaching and learning of emancipatory and norm critical knowledge, i.e. knowledge-of-practice, focused on topics such as how to promote equity and social justice (see Bianchini and Cavazos 2007; Burke and Collier 2017; Giannakaki et al. 2018; Ndlovu 2011; Riley 2015; Sales et al. 2011; Schabort et al. 2018). Another epistemic community could be established for socio-technical knowledge with a focus on ways to connect technological tools with teaching (see Bielaczyc 2006; Phelps and Graham 2008) – technological tools such as game-based learning (Chee et al. 2015), web 2.0 tools (Diacopoulos 2015) and hyper-media technologies (Jacobson 2008). Yet another epistemic community could be developed for didactic models focusing on orientation in and understanding of a specific school subject without having a norm critical focus (see Attorps and Kellner 2017; Ramnarain and Schuster 2014).

Epistemic communities could be created through school improvement networks (Peurach and Glazer 2016), network improvement communities (Martin and Gobstein 2015) or other forms of partnership between universities and schools. It has been stressed that universities and other research institutions are important in creating and sustaining networks through which more generic practice-based knowledge can flow (Enthoven and de Bruijn 2010), knowledge such as public practice-based knowledge and knowledge-of-practice.

Drawing on research, I also suggest that the knowledge flow between epistemic communities and local PLCs (communities of practice) should be circular. This flow could be envisioned as a movement from practice-based research in local contexts to the development of more general concepts and models, followed by exploration and exploitation of these concepts and models in other local contexts through processes of collaborative inquiry, which could then lead to further development of more generic practical knowledge, and so on (see Peurach and Glazer 2016). From the school perspective, the use of such knowledge flows can be described in the following way:

> The process is one of iteratively recreating tested, base-level operations in schools (exploitation); refining and extending capabilities at the school level in response to local needs and problems (exploration); and identifying, selecting, and exploiting favorable program improvements throughout the network. (Peurach and Glazer 2016, p. 4)

This type of circular knowledge flow and learning process has been contrasted to the linear research dissemination process (see Carlgren 2011; Vanderlinde and van Braak 2010), as expressed through notions like knowledge-*for*-practice (Cochran-Smith and Lytle 1999; Nelson 2009). Research has found that this linear, top-down knowledge dissemination often do not have much impact on teaching practices (see Chapter 1). For instance, teachers tend to not turn to research for inspiration on how to develop their teaching practices. Instead, teacher colleagues and teacher forums often provide this input – a type of input that is more easily applied in the classroom setting than abstract research (Vanderlinde and van Braak 2010), i.e. research in the form of knowledge-for-practice (Cochran-Smith and Lytle 1999; Nelson 2009). Nevertheless, much of the existing knowledge-for-practice (or mode 1 knowledge) could possibly be used to enrich the development of new public practice-based knowledge, knowledge-of-practice, and knowledge-in-practice if processed through collaborative, practice-based inquiry.

3.3.2 Measures to develop and sustain PLCs

Based on my review of the research literature, I have identified four types of measures that can help develop and sustain professional learning communities (see figure 1). In the following subsections, each type of measure is briefly introduced.

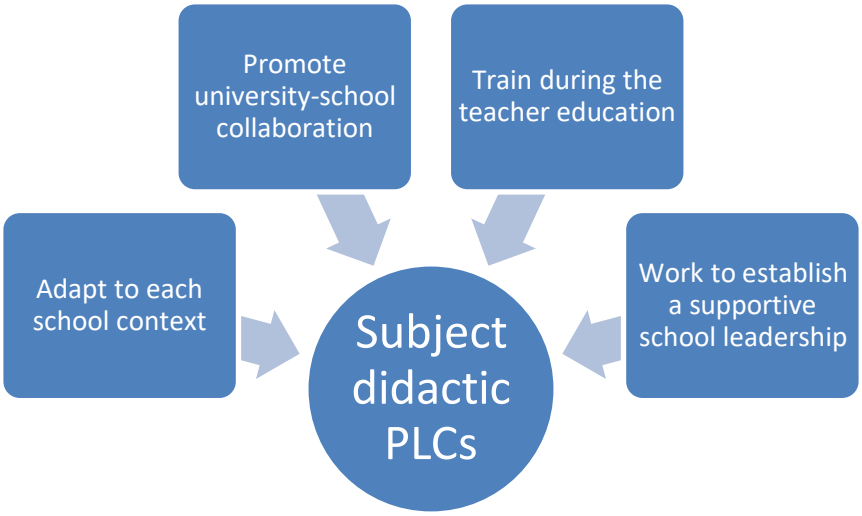

Figure 1. *Promoting subject didactic PLCs through four types of measures*

3.3.2.1 Adapt to each school context

To establish strong PLCs takes time. Research has shown that it often requires several years of committed work (Hipp et al. 2008; Wang 2015). Moreover, research has stressed that there is no one-size-fits-all strategy on how to promote PLCs. Rather, the strategies and measures need to be adapted to suit the specific school context in which the PLC format should be developed (Anderson and Herr 2011; Craig 2009; Craig 2013; Darling-Hammond and McLauglin 2011; Hipp et al. 2008). This means that the support should be tailored to fit each PLC's development phase and the needs within these phases, that contextual factors external to the school should be considered, and that the support should have its point of departure in local concerns and cultural norms in the school organization (although the school culture could change considerably as the school's PLCs mature).

Starting with the temporal dimension, there is research emphasizing that PLCs tend to go through different development phases (Bolam et al. 2005; Chen and Wang 2015; Grossman et al. 2001; Hipp et al. 2008; Mintrop and Charles 2017; Schneider et al. 2012; Stoll et al. 2006; Taylor et al. 2014). Several studies conceptualize this development as expressed through four phases:

1) *The non-initiated phase*. In this phase, actors at a school have become aware of the PLC concept's existence and what it entails, but the school has not started working in the PLC format and there is no previous experience of implementing and working with PLCs at the school.

2) *The initial phase*. In this phase, a decision is made to promote some form of PLC at the school.

3) *The implementation phase*. During this phase, there are concrete measures in place to implement the PLC structure at the school, such as measures creating new processes and encouraging the development of new norms, improving the conditions for working in the PLC format.

4) *The institutionalization phase* (also labeled the sustainability phase). At this phase the PLC format is an integrated and "natural" part of the everyday activities in the school organization (Schneider et al. 2012; Hipp et al. 2008; Chen and Wang 2015). The school has well-functioning professional learning communities in place. However, Grossman et al. (2001) emphasize that such PLCs need to be maintained. It is not a final destination but a constant process that needs to be nourished in order to be sustained (also emphasized by Dufour and Fullan 2013). Hence, organizational development efforts to support PLCs should not stop at this stage.

A key point made in research is that actors partaking in the process of establishing and developing PLCs should seek to identify the phase each PLC is currently in and adapt their measures on the basis of that information (Bolam et al. 2005; Chen and Wang 2015; Schneider et al. 2012). As Chen and Wang (2015) stress, PLCs develop gradually through the different phases and demand different types of support depending on which phase they are in. Based on their findings, they do for instance describe the type of support that a PLC in its initial phase (which also corresponds to the implementation phase described above) benefited from in the following terms:

> At the initial stage, approximately from the seventh month to the end of the first year of the HSP project, a team identity began to emerge. Internal and external support structures played a vital role in this transition. The school principal and administrators provided necessary resources and supportive conditions. They coordinated time and space for teachers to meet, connect and exchange new ideas. The university advisors helped these teachers to shift their dependence on administrative authority to expert authority, which supported the parallel leadership of teachers. Such expert authority encouraged and facilitated professional dialogue among teachers. Book study seminars, lesson plan meetings and peer observations and discussions provided them with opportunities to connect, conduct meaningful conversations, understand each other and increase their confidence to meet new challenges. (Chen and Wang 2015, p. 438f)

As shown in this quote, both internal and external change agents were involved at this stage. It could, however, be difficult to determine the development phase of a PLC, not the least for external change agents. Grossman et al. (2001) provide guidance to this diagnostics problem. They do so by distinguishing between pseudo communities (largely corresponding to the initial and implementation stage) and mature communities (mirroring the institutionalization phase). They emphasize that PLCs in early stages tend to be characterized by congeniality and thereby have the properties of what they call pseudo-communities. In a pseudo-community,

> [g]roups regulate face-to-face interactions with the tacit understanding that it is against the rules to challenge others or press too hard for clarification. This understanding paves the way for the illusion of consensus. (Grossman et al. 2001, p. 20)

In pseudo-communities, constructive critique, imperative to the collaborative inquiry process, becomes suppressed. A key indicator of community development is therefore whether there is a willingness in the group to engage in critique to improve the knowledge and practices of teachers, as well as student learning. A PLCs development from a pseudo-community to a mature community (or from the implementation phase to the institutionalization phase) is accordingly indicated by the inclination to engage in critique and clarification, and this transition is likely to take time. Moreover, formative assessment tools could provide guidance in pinpointing the needs of a PLC. This includes identification of needs within a specific development phase (see Taylor et al. 2014; Woodland 2016). The key point to be made here is that the support for PLC development is likely to be more effective if it is adapted to the stage or phase that the PLC is currently

in. Furthermore, there is research providing guidance and tools for identifying these stages and assist in the identification of the needs within each stage.

Other factors that should be considered are contextual factors external to the school organization. Students' socio-economic status (Bolam et al. 2005) and the location of the school do for instance produce different conditions for PLCs (Stoll et al. 2006). Nevertheless, even when these factors are unfavorable, they should not be seen as insurmountable barriers. There are for instance indicators suggesting that PLCs can be established and function well even in contexts when socio-economic factors are unfavorable for student learning (Bryk et al. 1999; Hipp et al. 2008), as emphasized in the following passage:

> Perhaps the most important and hopeful conclusion to be drawn from this research is that a professional community can exist in very ordinary urban schools. Moreover, positive teacher reports about professional community came from a wide cross-section of schools. Student-body composition in terms of race and ethnicity, socioeconomic factors, and even academic background was not a strong predictor of a school's professional community. (Bryk et al. 1999, p. 771f)

At the same time, it should be made clear that external pressures and other factors producing stressful environments, which are likely to be more pronounced in schools with relatively low student performance, could have hampering effects on the development of well-performing PLCs (see Mintrop and Charles 2017).

Another contextual factor that schools are likely to have little control over is the size of the school. Some studies indicate that it is often easier to promote PLCs in relatively small schools (Bryk et al. 1999; Darling-Hammond and Richardson 2009). In sum, there are factors external to the school organization creating unequal opportunities for developing well-functioning PLCs. Nevertheless, there is research showing that, even under unfavorable conditions, well-functioning PLCs can be developed.

Finally, an important organizational factor that PLC initiatives should consider is the concerns and norms of the local school culture. It is highlighted that local teaching practices and concerns should be the

point of departure in initiatives set on promoting PLCs at a school. A core notion of PLCs is that they are based on a situated approach, meaning that there is a need to be sensitive to local practices and concerns, and other aspects of the school culture (e.g. Allen 2013; Birenbaum et al. 2009; Birenbaum et al. 2011; Musanti 2017; Nelson and Slavit 2007; Pella 2011). Having the school culture as the point of departure makes it possible to identify barriers and opportunities for PLC development in each organizational context. This also means that these cultural concerns and norms should be utilized as a basis for advancing the PLC format with its critical and reflective collaborative inquiry processes. Accordingly, an argument is that a situated approach increases the potential for fruitful mutual learning, including learning between researchers and teachers in university-school partnerships (Dolan and Tanner 2005; Nehring and O'Brien 2012; Whitney 2013), between teachers and the administrative leadership (see section 3.3.2.4), and among the teachers that are to work together in a PLC (Anderson and Herr 2011). By grounding the work in local concerns and practices, it is also stressed that the teachers are more likely to transform their new insights into teaching practices and thereby perceive the benefits of working collaboratively in PLCs. This approach to PLC development is thus more likely to gain support and be viewed as legitimate by the teachers. This is contrasted to the top-down implemented and one-size-fits-all approach that, in some places, have been used to promote PLCs in schools (Anderson and Herr 2011; Craig 2009; Craig 2013; Darling-Hammond and McLauglin 2011).

3.3.2.2 Promote university-school collaboration

Research grounded in a situated approach, in which the production of new knowledge is based on different forms of collaboration between researchers and teachers, is described as important in developing PLCs. As mentioned, this type of practice-based research is important for developing research-in-practice/mode 2 knowledge, research-of-practice, and public practice-based knowledge. In this subsection, I review studies on university-school collaboration and present some of their arguments of how this type of collaboration can be beneficial.

One reason for the emphasis on university-school collaboration is that many current forms of teacher cooperation, including weak or pseudo PLCs, are characterized by norms of congeniality. These forms of teacher cooperation are characterized by a lack of the constructive critique needed for improving teaching practices and student learning. By contrast, well-functioning PLCs are characterized by collaborative inquiry marked by critique, deconstruction, and reconstruction of teaching practices. For critical inquiry to emerge, environments need to develop in which teachers and administrative personnel trust and respect each other – also discussed in terms of environments with a strong social capital – and where teachers' are affirmed and feel safe to share their teaching practices (Allen 2013; Aubusson et al. 2007; Botha 2012; Bryk et al. 1999; Burn et al 2007; Capobianco and Feldman 2006; Cranston 2009; Nelson 2009; Snow-Gerono 2005; Wennergren 2016) (cf. the emphasis on the need for different support depending on the phase in which the PLC is in, as described in section 3.3.2.1).[7] A study using critical friend groups (which can be described as a type of PLC) to advance critical inquiry, provides a clear illustration of this interdependence:

> A characteristic of a critical friend is the unexpected combination of, on the one hand, friendship built on trust, support and affirmation and, on the other, criticism based on analysis, assessment, evaluation and quality [...]. Trust has been identified as a key feature for critical friends [...] and also described as the emotional catalyst that makes risk-taking and conflicts an essential part of learning. Strong professional communities depend on teachers' capacity to blend commitment with doubt, along with healthy disagreements about teaching [...]. (Wennergren 2016, p. 263)

7 There are also tools designed to advance such safe environments, for instance in the form of protocols (e.g. Wood 2007). However, it has been argued that, at a quite early stage and in parallel to the use of such tools, it is important to use tools developing competence in critical inquiry so as to not linger at the stage of merely developing trust but also progressing to processes marked by critical inquiry (Wood 2007). In addition to protocols (Allen 2013; Norman et al. 2005; Wood 2007), other tools and techniques for advancing critical inquiry discussed and suggested in the literature are: learning studies (Attorps and Kellner 2017; Tan and Caleon 2016), lesson studies (Chassels and Melville 2009; Gee and Whaley 2016; Pella 2011), records of practice (Ball et al. 2014), formative assessment tools (Taylor et al. 2014; Woodland 2016), methods and practices used in theater production (Allen 2013), and organizing frames for analyzing and locating learning in collaborative teacher communities (Little 2002).

Researchers can play an important role in supporting the emergence of this type of inquiry, for instance through partnerships or programs, involving both teachers and researchers, providing professional development. Through such collaboration, researchers can provide training and function as facilitators during the implementation of PLCs, when competence in how to conduct critical and reflective inquiry processes is to be developed among teachers (McConnell et al. 2013; Ndlovu 2011; Svanbjörnsdóttir et al. 2016a; Wennergren 2016;). During this process, the researcher can also mentor and train teachers to lead inquiry processes independently of the researcher, thereby contributing to the development of school-based competence for carrying out critical inquiry (e.g. Svanbjörnsdóttir et al. 2016a; Wennergren 2016). In this way, they can help advance what in other research is described as the sustainability or institutionalization phase (see section 3.3.2.1).

As suggested in section 3.3.1, university-school collaboration could also play a key role in developing and sustaining generic practical knowledge (Cochran-Smith and Lytle 1999; Enthoven and de Bruijn 2010; Nelson 2009), for instance by establishing epistemic communities in the form of school improvement networks (Peurach and Glazer 2016) or network improvement communities (Martin and Gobstein 2015).

3.3.2.3 Train during the teacher education

In this section, I present studies examining how the inquiry-based and collaborative PLC format can be advanced in relation to preservice teachers and their teacher education. Some of these studies are focused on initiatives to equip preservice teachers with collaborative inquiry skills in preparation for their practicum as well as during it (Chassels and Melville 2009; Norman et al. 2005; Santagata and Guarino 2012). Chassels and Melville (2009) do for example examine the benefits and challenges of using lesson studies during preservice teachers' practicum as a tool for fostering collaborative inquiry skills. Among the benefits were new insights related to curriculum, teaching strategies, and student needs. These benefits were reported by both the preservice teachers and the school-based teacher educators. Improved skills to provide and openness to

receive critical feedback among preservice teachers were also found. Challenges included issues such as individualistic teaching cultures at the schools in which the practicums took place, a lack of time to work with collaborative inquiry, and that many of the school-based teacher educators lacked training in the lesson study method.

Other studies examine preservice teachers' practicum as a platform for facilitating deepened and more authentic collaboration between university instructors and school-based teacher educators (also termed cooperating teachers). An argument for this focus is that school-based teacher educators, according to some studies, have the strongest influence on preservice teachers. However, in spite of this, there are indicators suggesting that teachers' development into school-based teacher educators is a neglected topic. The establishment of school advisor networks, a type of PLC between school-based educators and university instructors, is proposed as a way of mending this deficiency (see Nielsen et al. 2010).

Some studies also examine initiatives for developing teacher students' collaborative inquiry skills through courses located at their university (Andersen and Matkins 2011; Santagata and Guarino 2012). One such study used an action research approach to examine the use of blogs as a tool to encourage preservice science teachers to collaboratively reflect on their teaching methods and practices, both during a methods course and during their practicum. As a result, the researchers provided recommendations for both curriculum improvement, for example by emphasizing the importance of providing clear instructions on what reflective practice entails, and organizational improvement (Andersen and Matkins 2011).

One study also examined preservice teachers' access to processes in which school-based teacher-educators construct context-specific and applied professional craft knowledge (also termed subject-specific pedagogical knowledge). Through two sub-studies, the authors of this study identified one school-based context in which preservice teachers had access to this collaborative production of subject-specific pedagogical knowledge. This school context was characterized by an ethos of mutual respect, trust, and care. It was not seen as a sign of

failure to share doubts regarding teaching practices. There was a strong institutional commitment to this type of knowledge production, and spaces reserved for teams to develop this knowledge. Interestingly, the second sub-study indicated that when preservice teachers' practicum entails a focus on contested aspects of the curriculum, it can create insecurities among the school-based teacher-educators, thereby hampering their willingness to share and collaboratively produce subject-specific pedagogical knowledge with the preservice teachers (Burn et al. 2007).

3.3.2.4 Work to establish a supportive school leadership

The research literature stresses that the administration and administrative leadership – especially the leadership of the principal(s) – plays a key role in setting the conditions for developing PLCs at schools. In this role, these actors can contribute to facilitating supportive conditions, but there are also examples when they have set conditions hampering the advancement of PLCs. A supportive administrative leadership is thus a key factor for PLC development (Bolam et al. 2005; Bryk et al. 1999; Cranston 2009; Gee and Whaley 2016; Hipp et al. 2008; Horton and Martin 2013; Huffman et al. 2001; LeChasseur et al. 2016; Roy and Hord 2006; Stoll et al. 2006; Wang 2016).

One component of a supportive administrative leadership is that it is characterized by top-down support enabling bottom-up driven change. This emphasis should be seen in light of research stressing that there is no one-size-fits-all strategy for developing PLCs, meaning that it is important to adapt the strategies to suit each particular school context (Anderson and Herr 2011; Craig 2009; Craig 2013; Darling-Hammond and McLauglin 2011; Hipp et al. 2008). Consequently, a mix of top-down and bottom-up approaches is proposed:

> […] state of the art educational improvement theory suggests a conceptual framework that harnesses both top-down and bottom-up energies for high performance. The top provides a system-wide vision for improvement, accountability, and support for capacity building; the bottom exercises limited autonomy (bounded by the system vision) while engaging in intelligent, collaborative action. (Nehring and O'Brien 2012, p. 455)

The proposed mix of top-down and bottom-up approaches thus entails that principals and other administrative leaders primarily focus on facilitating supportive conditions for PLCs (cf. PLCs for principals in section 3.2). Accordingly, they should also engage in an ongoing dialogue with the teachers to ensure proper measures are taken.[8] By contrast, top-down steering means that PLCs are commanded and enforced from above, with no or minimal inclusion of bottom-up input (Botha 2012; Darling-Hammond and McLaughlin 2011; Huffman et al. 2001; Kafyulilo 2013; Khourey-Bowers et al. 2005; Nehring and O'Brien 2012; Nelson and Slavit 2007; Roy and Hord 2006; Ryan et al. 2009). This top-down steering has been described as detrimental, for instance by having a tendency of producing enforced collaboration or contrived collegiality, resulting in superficial teamwork rather than genuine collegiality supportive of authentic inquiry processes (e.g. Hargreaves 1994; Snow-Gerono 2005; Taylor et al. 2014; Wang 2015).

Another aspect of the suggested mix of top-down and bottom-up approaches is that the administrative leadership supports and promotes the development of shared leadership, also discussed in terms of distributed leadership (Aubusson et al. 2007; Bolam et al. 2005; Botha 2012; Gee and Whaley 2016; Hipp et al. 2008; Horton and Martin 2013; Richmond and Manokore 2011; Roy and Hord 2006; Wang 2016), especially by encouraging the development of teacher leadership[9] as an important part of improving the conditions

8 Some research also argue that it is import to include other school staff, parents, and students in the process of establishing and developing PLCs at schools (e.g. Svanbjörnsdóttir et al. 2016b). Moreover, there are examples of studies focusing on PLCs encompassing collaboration between schools and local organizations representing a specific profession. One example of this is a study of PLCs that were developed for improving English language art instruction through collaboration between schools and local art organizations (Ellrodt et al. 2014). This would entail that the administrative leadership engages in dialogues with those other actors as well.

9 The definitions of teacher leadership vary somewhat. An example of a definition is: "the process by which teachers, individually or collectively, influence their colleagues, principals, and other members of school communities to improve teaching and learning practices with the aim of increased student learning and achievement" (York-Barr and

for collaborative inquiry processes and other characteristics of well-functioning and sustainable PLCs (Carpenter 2017; Hairon et al. 2015; Harris 2003; Hipp et al. 2008; Huffman et al. 2001; Khourey-Bowers et al. 2005; Muijs and Harris 2003; Salleh 2016).[10] The principal in particular is described as a key actor for promoting the development of a shared leadership:

> The findings from this study convincingly indicate effective principals nurture, empower, and provide opportunities for teachers to assume shared leadership roles. In fact, this element may be the most promising factor in developing and sustaining professional learning communities. (Huffman et al. 2001, p. 459f)

One example of how shared leadership can be advanced is through investments in teacher leadership training, such as training in facilitating collaborative critical inquiry processes and in mentoring (e.g. Muijs and Harris 2003). Another example is that the administrative leadership involves the teachers in co-producing a shared vision for the school (Botha 2012; Huffman et al. 2001).

Yet another aspect of the administrative support, for which dialogue with the teachers is crucial, is to adapt and shape school policies in ways that create synergies and reduce clashes with the efforts to work in PLCs. One part of this is to develop school staffing policies encouraging and spurring teachers to develop their professional roles to become more collaborative, and that the principals demonstrate a substantial interest in this development. This includes providing time, space, and incentives for such undertakings (Aubusson et al. 2007; Bolam et al. 2005; Bond 2013; Bryk et al. 1999; Mintzes et al. 2013; Stoll et al. 2006) as well as contributing to the improvement of the school's networking capacity with other schools and organizations (Bolam et al. 2005; Mintzes et al. 2013). Another part of this is to assess current school policies and, when needed, seek to adapt them to become supportive of the processes of establishing and developing

---

Duke 2004, p. 287–288, cited from Hairon et al. 2015, p. 164). For other definitions, see Harion et al. (2015, p. 164) and Harris (2003, p. 315ff).

10 Related to this, there are also studies focusing on the role of teacher mentorship in introducing novice teachers to the PLC format (van Ginkel et al. 2016).

PLCs (Darling-Hammond and McLaughlin 2011). This entails that the principal and other school leaders filter and adapt external demands on the school so that these do not clash with the PLCs, but preferably support their development, as stated in the following passage:

> School leaders must also manage district administrators' attempts to influence teachers' classroom practice by seeking to align district initiatives with school initiatives and buffering district-initiated programs that are not aligned with their school's vision. (LeChasseur et al. 2016, p. 270)

This type of leadership measure should especially be seen in light of conflicts between collaborative professionalism based on inquiry (as in strong PLCs) and management professionalism characterized by top-down policies and, linked to these, different forms of standardization that sets limits for collaborative inquiry (Darling-Hammond and McLaughlin 2011; Lofthouse and Thomas 2017). Conflicts between standardization trends and situated collaborative inquiry – the latter being premised on context sensitive knowledge production – have also been highlighted (Anderson and Herr 2011; Berger et al. 2005).

The emphasis on assessing and adapting school policies also relates to observations that there at times are incentives encouraging individualized professional development rather than collaborative professional development. In the North American context there is for instance research arguing "[…] that attention should shift from focusing on individuals (eg. merit pay, career ladders etc) to developing schools as professional learning communities" (Bolam et al. 2005, p. 7).

The frequent occurrences of goal conflicts and competing power structures at schools, as emphasized in micro-political research on school development, should also be considered by the school leadership. The micro-political research stresses that such conflicts are often key barriers to PLC development, in addition to factors such as a lack of guidance, capacity building, and social capital (e.g. Ball 1987; LeChasseur et al. 2016). At the same time, it is highlighted that conflicts between teachers, when used productively, are a key ingredient in promoting reflection and development (Bolam et al.

2005; LeChasseur et al. 2016; Musanti 2017), as expressed in the following passage:

> [...] when teachers engage in genuine collaborative PD [professional development], conflict becomes part of the process of questioning one's beliefs opening the possibility for change. The goal of TPLC [teacher professional learning communities] should not be to generate a common set of beliefs or a unified way of thinking about practice but to foster professional growth embracing conflict, engaging in critical reflection, and allowing dissent to avoid stagnation. (Musanti 2017, p. 295)

As stressed by Mintrop and Charles (2017), there are nonetheless different types of conflict. A combination of low levels of relationship conflict, strong value consensus, and high degrees of task conflict are for example presented as a characteristic of effective PLC groups. They also emphasize that conflicts can be more or less productive depending on when they are played out in a PLC's development. Hence, when learning how to utilize conflicts productively, it is worth acknowledging that there are different types of conflicts and that the PLC's development phase should be considered.

A final aspect of a leadership supportive of PLCs is that it encourages the development of a culture supportive of critical inquiry (although this overlaps with the other aspects that has been outlined above). For instance, it is underscored that the principal(s) can communicate support for collaborative inquiry by encouraging a culture of trust and openness (Bolam et al. 2005; Bond 2013; Cranston 2009; Darling-Hammond and McLaughlin 2011; Huffman et al. 2001; Roy and Hord 2006). As emphasized, "[l]eaders must create and sustain settings in which teachers feel safe to admit mistakes, to try (and possibly fail), and to disclose aspects of their teaching" (Darling-Hammond and McLaughlin 2011, p. 87). In line with this research, it is stressed that school leaders can help spur changes in the school culture towards the type of collaborative professional culture expressed through strong PLCs. Wang (2015) do for example argue that what he calls "arranged collegiality" can be advanced through long-term commitment that is sensitive to the school culture while also seeking to reshape it. Part of this reshaping process is the construction of new opportunities, incentives, and expectations on teachers to work collaboratively. This is contrasted to contrived collegiality, in which collegiality between teachers is forced from above and implemented in a speedy and

culturally insensitive fashion. Although there is at times a fine line between arranged and contrived collegiality, Wang (2015) contends that arranged collegiality, carried out in this sensitive, facilitative, and supportive fashion, can play an important role in transforming school cultures to become more collaborative and thus supportive of effective PLCs. Moreover, a key difference is that arranged collegiality corresponds to the mix of top-down and bottom-up approaches described earlier, while contrived collegiality is symptomatic of the top-down approach.

In sum, these various aspects of leadership points to the importance of working to promote a supportive school leadership, for example through training programs for principals, but also to advance policies that encourage and empower school leaders to develop and sustain PLCs.

4 Concluding summary

In this report, I have presented research findings demonstrating the benefits of professional learning communities (PLCs). I have also identified the defining characteristics of PLCs, and provided a research informed discussion of how a PLC infrastructure could be promoted. In this chapter, I briefly summarize the findings and discussion of the reviewed literature and conclude with the implications for future research. As mentioned elsewhere in this report, my specific focus is on PLCs as an infrastructure for developing subject didactic professional knowledge among teachers in Swedish primary and secondary schools and, related to this, improved student learning in the specific school subjects.

To start with, there is research pointing to several benefits with PLCs. These benefits include perceptions of increased professional learning and enhanced teaching efficacy among teachers, actual changes of teaching practices, overall movements toward more collaborative school cultures, and improved student learning. Taken together, this suggests that there are good reasons to pursue the development of PLCs, not the least in the Swedish school system where empirical evidence suggests that the type of collaborative professionalism facilitated by PLCs is underdeveloped.

Based on my reading of the research literature, the defining characteristics of PLCs are: (1) that they are integrated in the school organization as a part of its routines; (2) that the local school context – with its practices, knowledge, and concerns – is the point of departure for the PLC development process; (3) that collaborative and reflective inquiry is carried out and cultivated; (4) that there is a shared vision and goals for student learning, and; (5) that the teachers and the school leadership take collective responsibility for student learning. Related to this, there are different ways of organizing PLCs. However, since my focus is on PLCs for developing subject didactic knowledge among teachers and for improving students learning in specific school subjects, I have primarily focused on PLCs organized around specific school subjects, such as civics or history. These PLCs are comprised of teachers from one discipline. Nevertheless, other

PLCs, such as PLCs consisting of principals or a mix of school staff, could also be important for improving the conditions for PLCs with a disciplinary focus.

Grounded in research findings, I have offered a discussion with tentative suggestions of how the development of a PLC infrastructure with a subject didactic focus could be promoted. First of all, I have argued for the advancement of a PLC infrastructure designed to promote collaborative inquiry that produces both context-specific knowledge and learning, and more generic practice-based knowledge. I have discussed the more context-specific knowledge in terms of knowledge-in-practice/mode 2 knowledge, and suggested that communities of practice would be an appropriate PLC format for this type of knowledge. I have also stressed that external facilitators, especially researchers, can help facilitate the type of collaborative inquiry process that supports the production of this type of practice-based knowledge. I have also suggested that researchers and universities could play a key role in promoting the more generic practical knowledge discussed in terms of public practice-based knowledge and knowledge-of-practice. This type of knowledge is developed through practice-based research as well. However, to enable a more wide-spread flow of this generic practical knowledge, I have suggested that epistemic communities offer an appropriate community format for this type of knowledge. That is, epistemic communities could support a flow of more generic practical knowledge across school contexts, which could then be adapted, exploited, and further developed during the collaborative processes at the school-based PLCs (the communities of practice) and through other forms of collaborative practice-based research between teachers and researchers. Moreover, university-school partnerships could play a key role in developing and sustaining these epistemic communities.

Second, I have identified and discussed four different types of partially overlapping measures that, in combination, could contribute to the development of well-functioning and sustainable PLCs. These measures are:

1) *Adapt to each school context*. This entails adapting measures for PLCs development to: (i) the development phase of each particular PLC, (ii) the external contextual factors effecting the conditions for the PLCs development, and (iii) the specific traits in the culture of the school organization.

2) *Promote university-school collaboration*. University-school collaboration can contribute to the development of PLCs at schools, not the least since researchers can play an important role in training teachers and, thereby, in facilitating conditions for critical and reflective inquiry processes between teachers. University-school collaboration could also be of key importance for developing generic practice-based knowledge, based on practice-based research, and for developing and sustaining epistemic communities through which such knowledge can circulate and be further developed by communities of practice, academia, and other relevant organizations.

3) *Train during the teacher education*. The teacher education can be used as a platform to train preservice teachers in collaborative and reflective inquiry. There is also research suggesting that PLCs with a focus on improving collaboration between university instructors and school-based teacher educators is beneficial for the teacher education.

4) *Work to establish a supportive school leadership*. Several studies emphasize that the administrative leadership, especially the school principal(s), are key actors in facilitating conditions supportive of the development and sustaining of PLCs, notably through a mix of top-down and bottom-up approaches, but that they can also counteract such supportive conditions. This does, among other things, put the spotlight on the training of school principals but also on the importance of promoting policies that empower school leaders to be supportive of PLCs.

As mentioned, these four types of measures should be seen as complementary and partially overlapping. Together they, and the suggestion to promote different types of practice-based knowledge

through a mix of communities of practice and epistemic communities, offer a path that could lead to PLCs being developed and sustained in the Swedish primary and secondary schools – PLCs marked by practice-based, collaborative inquiry supporting teachers' subject didactic professional development and students' learning chances. However, although the report's suggestions on how to promote PLCs are grounded in research, they are nevertheless tentative and their potential to promote well-functioning PLCs in Swedish schools is uncertain. This being said, they provide several research-informed ideas that can prove useful to future research with the ambition to test and further develop models that seek to advance practice-based research and collaborative subject didactic professionalism, both in the Swedish school system and elsewhere. Hence, this literature review should be seen as an attempt to make a modest contribution to the development of a more collaborative professionalism among teachers – a professionalism that can improve both teaching and student learning.

References

Allen, D. (2013). Reconstructing Professional Learning Community as Collective Creation. *Improving Schools* 16(3), 191–208.

Andersen, L. and Matkins, J.J. (2011). Web 2.0 Tools and the Reflections of Preservice Secondary Science Teachers. *Journal of Digital Learning in Teacher Education* 28(1), 27–38.

Anderson, G.L. and Herr, K. (2011). Scaling up "Evidence-Based" Practices for Teachers Is a Profitable but Discredited Paradigm. *Educational Researcher* 40(6), 287–289.

Attorps, I. and Kellner, E. (2017). School-University Action Research: Impacts on Teaching Practices and Pupil Learning. *International Journal of Science and Mathematics Education* 15, 313–330.

Aubusson, P., Steele, F., Dinham, S. and Brady, L. (2007). Action Learning in Teacher Learning Community Formation: Informative or Transformative? *Teacher Development* 11(2), 133–148.

Ball, D.L., Ben-Peretz, M., and Cohen, R.B. (2014). Records of Practice and the Development of Collective Professional Knowledge. *British Journal of Educational Studies* 62(3), 317–335.

Ball, S.J. (1987). *The micro-politics of the school: Towards a theory of school organization*. London and New York: Routledge.

Barber, M., and M. Mourshed. (2007). *How the World's Best-performing School Systems Come out on Top*. London: McKinsey.

Bausmith, J. M. and Barry, C. (2011). Revisiting professional learning communities to increase college readiness: The importance of pedagogical content knowledge. *Educational Researcher*, 40(4), 175–178.

Berger, J.G., Boles, K.C. and Troen, V. (2005). Teacher Research and School Change: Paradoxes, Problems, and Possibilities. *Teaching and Teacher Education: An International Journal of Research and Studies* 21, 93–105.

Bianchini, J.A. and Cavazos, L.M., (2007). Learning from Students, Inquiry into Practice, and Participation in Professional Communities: Beginning Teachers' Uneven Progress toward Equitable Science Teaching. *Journal of Research in Science Teaching* 44(4), 586–612.

Bielaczyc, K. (2006). Designing Social Infrastructure: Critical Issues in Creating Learning Environments with Technology. *Journal of the Learning Sciences* 15(3), 301–329.

Birenbaum, M., Kimron, H. and Shilton, H. (2011). Nested Contexts That Shape Assessment "for" Learning: School-Based Professional Learning Community and Classroom Culture. *Studies in Educational Evaluation* 37, 35–48.

Birenbaum, M., Kimron, H., Shilton, H. and Shahaf-Barzilay, R. (2009). Cycles of Inquiry: Formative Assessment in Service of Learning in Classrooms and in School-Based Professional Communities. *Studies in Educational Evaluation* 35, 130–149.

Bolam, R., McMaholm, A., Stoll, L., Thomas, S. and Wallace, M. (2005). *Creating and sustaining professional learning communities* (No. Research Report Number 637). London: General Teaching Council for England, Department for Education and Skills.

Bond, N. (2013). Developing a Professional Learning Community among Preservice Teachers. *Current Issues in Education* 16(2), 1-16.

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher* 33, 3–15.

Botha, E.M. (2012). Turning the Tide: Creating Professional Learning Communities (PLC) to Improve Teaching Practice and Learning in South African Public Schools. *Africa Education Review* 9(2), 395–411.

Bryk, A., Camburn, E. and Louis, K.S. (1999). Professional community in Chicago elementary schools: Facilitating factors and organizational consequences. *Educational Administration Quarterly*, 35 (Special Issue), 751–781.

Burke, A. and Collier, D.R. (2017). "I Was Kind of Teaching Myself": Teachers' Conversations about Social Justice and Teaching for Change. *Teacher Development* 21(2), 269–287.

Burn, K., Childs, A. and McNicholl, J. (2007). The Potential and Challenges for Student Teachers' Learning of Subject-Specific Pedagogical Knowledge within Secondary School Subject Departments. *Curriculum Journal* 18(4), 429–445.

Capobianco, B.M. and Feldman, A. (2006). Promoting Quality for Teacher Action Research: Lessons Learned from Science Teachers' Action Research. *Educational Action Research* 14(4), 497–512.

Carlgren, I. (2011). Forsning ja, men i vilket syfte och om vad? Om avsaknaden och behovet av en 'klinisk' mellanrumsforskning. In S. Eklund (Ed.), *Lärare som praktiker och forskare. Om praxisnära forskningsmodeller*. Stockholm: Stiftelsen SAF i samverkan med Lärarförbundet.

Carpenter, D. (2017). Collaborative Inquiry and the Shared Workspace of Professional Learning Communities. *International Journal of Educational Management* 31(7), 1069–1091.

Chassels, C. and Melville, W. (2009). Collaborative, Reflective, and Iterative Japanese Lesson Study in an Initial Teacher Education Program: Benefits and Challenges. *Canadian Journal of Education* 32(4), 734–763.

Chee, Y.S., Mehrotra, S. and Ong, J.C. (2015). Authentic Game-Based Learning and Teachers' Dilemmas in Reconstructing Professional Practice. *Learning, Media and Technology* 40(4), 514–535.

Chen, P. and Wang, T. (2015). Exploring the Evolution of a Teacher Professional Learning Community: A Longitudinal Case Study at a Taiwanese High School. *Teacher Development* 19(4), 427–444.

Chow, K.C.K., Chu, S.K.W., Tavares, N. and Lee, C.W.Y. (2015). Teachers as Researchers: A Discovery of Their Emerging Role and Impact through a School-University Collaborative Research. *Brock Education: A Journal of Educational Research and Practice* 24(2), 20–39.

Cochran-Smith, M. and Lytle, S. L. (1999). Relationships of knowledge and practice: Teacher learning in communities. In A. Iran-Nejad & P. D. Pearson (Eds.), *Review of research in education* (Vol. 24, pp. 249–306). Washington, DC: AERA.

Cordingley, P. (2015). The contribution of research to teachers' professional learning and development. *Oxford Review of Education* 41(2), 234–252.

Craig, C.J. (2013). Coming to Know in the "Eye of the Storm": A Beginning Teacher's Introduction to Different Versions of Teacher Community. *Teaching and Teacher Education: An International Journal of Research and Studies* 29, 25–38.

Craig, C.J. (2009). Research in the Midst of Organized School Reform: Versions of Teacher Community in Tension. *American Educational Research Journal* 46(2), 598–619.

Cranston, J. (2009). Holding the Reins of the Professional Learning Community: Eight Themes from Research on Principals' Perceptions of Professional Learning Communities. *Canadian Journal of Educational Administration and Policy* 90, 1–22.

D'Ardenne, C., Barnes, D.G., Hightower, E.S., Lamason, P.R., Mason, M., Patterson, P.C., Stephens, N., Wilson, C.E., Smith, V.H. and Erickson, K.A. (2013). PLCs in Action: Innovative Teaching for Struggling Grade 3-5 Readers. *Reading Teacher* 67(2), 143–151.

Darling-Hammond, L., and McLaughlin, M. W. (2011). Policies that support professional development in an era of reform. *Phi Delta Kappan*, 92(6), 81–92.

Darling-Hammond, L., and Richardson, N. (2009). Teacher learning: What matters? *Educational Leadership*, 5(66), 46–53.

Diacopoulos, M.M. (2015). Untangling Web 2.0: Charting Web 2.0 Tools, the NCSS Guidelines for Effective Use of Technology, and Bloom's Taxonomy. *Social Studies* 106, 139–148.

Dolan, E. and Tanner, K. (2005). Points of View: Effective Partnerships between K-12 and Higher Education--Moving from Outreach to Partnership: Striving for Articulation and Reform across the K-20+ Science Education Continuum. *Cell Biology Education* 4, 35–37.

Dufour, R. and Fullan, M. (2013). *Cultures Built to Last: Systemic PLCs at Work*. Bloomington, IN: Solution Tree Press.

Eklund, S. (Ed.) (2011). *Lärare som praktiker och forskare: Om praxisnära forskningsmodeller*. Stockholm: Stiftelsen SAF i samarbete med Lärarförbundet.

Ellrodt, J.C., Fico, M., Harnett, S., Ramsey, L.G. and Lopez, A. (2014). The Mirror and the Canyon: Reflected Images, Echoed Voices How Evidence of GW's Performing Arts Integration Model Is Used to Build Support for Arts Education Integration and to Promote Sustainability. *Journal for Learning Through the Arts* 10(1).

Enthoven, M. and de Bruijn, E. (2010). Beyond Locality: The Creation of Public Practice-Based Knowledge through Practitioner Research in Professional Learning Communities and Communities of Practice. A Review of Three Books on Practitioner Research and Professional Communities. *Educational Action Research* 18(2), 289–298.

Esaiasson, P., Gilljam, M., Oscarsson, H. and Wängnerud, L. (2012). *Metodpraktikan*, Stockholm: Norstedts juridik AB.

Francis, K. and Jacobsen, M. (2013). Synchronous Online Collaborative Professional Development for Elementary Mathematics Teachers. *The International Review of Research in Open and Distance Learning* 14(3), 319-343.

Gee, D. and Whaley, J. (2016). Learning Together: Practice-Centred Professional Development to Enhance Mathematics Instruction. *Mathematics Teacher Education and Development* 18(1), 87–99.

Giannakaki, M.-S., McMillan, I.D. and Karamichas, J. (2018). Problematising the Use of Education to Address Social Inequity: Could Participatory Action Research Be a Step Forwards? *British Educational Research Journal* 44(2), 191–211.

Grossman, P., Wineburg, S. and Woolworth, S. (2001). Toward a theory of teacher community. *Teachers College Review* 103(6), 942–1012.

Hairon, S., Goh, J.W.P. and Chua, C.S.K. (2015). Teacher Leadership Enactment in Professional Learning Community Contexts: Towards a Better Understanding of the Phenomenon. *School Leadership & Management* 35(2), 163–182.

Harris, A. (2003). Teacher leadership as distributed leadership: Heresy, fantasy or possibility? *School Leadership and Management* 23(3), 313–324.

Hipp, K.A. and Huffman, J.B. (2008). Sustaining Professional Learning Communities: Case Studies. *Journal of Educational Change* 9(2), 173–195.

Hodes, C.L., Foster, J.C., Pritz, S.G. and Kelley, P. (2011). Structuring Professional Development with an Online Community. *Journal of Educational Technology Systems* 39(3), 295–319.

Holligan, C. (2006). Learning in Cyberspace: An Ethnographic Perspective on the Scottish "Chartered Teacher" Programme. *European Journal of Teacher Education* 29(4), 545–567.

Holmberg, J. (2017). Applying a Conceptual Design Framework to Study Teachers' Use of Educational Technology. *Education and Information Technologies* 22, 2333–2349.

Hopkins, D., Stringfield, S., Harris, A., Stoll, L. and Mackay, T. (2014). School and System Improvement: A Narrative State-of-the-Art Review. *School Effectiveness and School Improvement* 25(2), 257–281.

Horton, J. and Martin, B.N. (2013). The Role of the District Administration within Professional Learning Communities. *International Journal of Leadership in Education* 16(1), 55–70.

Huffman, J.B., Hipp, K.K., Pankake, A.M. and Moller, G. (2001). Professional learning communities: Leadership, purposeful decision making, and job-embedded staff development. *Journal of School Leadership* 11(5), 448 – 463.

Hughes, J.E., Kerr, S.P. and Ooms, A. (2005). Content-Focused Technology Inquiry Groups: Cases of Teacher Learning and Technology Integration. *Journal of Educational Computing Research* 32(4), 367–379.

Ion, G. and Iucu, R. (2014). Professionals' Perceptions about the Use of Research in Educational Practice. *European Journal of Higher Education* 4(4), 334–347.

Jacobson, M.J. (2008). A design framework for educational hypermedia systems: theory, research, and learning emerging scientific conceptual perspectives. *Educational Technology Research and Development* 56, 5–28

Jarl, M., Blossing, U., and Andersson K. (2017). *Att organisera för skolframgång: strategier för en likvärdig skola*. Stockholm: Natur & Kultur.

Jones, A. and Moreland, J. (2005). The Importance of Pedagogical Content Knowledge in Assessment for Learning Practices: A Case-Study of a Whole-School Approach. *Curriculum Journal* 16(2), 193–206.

Kafyulilo, A.C. (2013). Professional Development through Teacher Collaboration: An Approach to Enhance Teaching and Learning in Science and Mathematics in Tanzania. *Africa Education Review* 10(4), 671–688.

Khourey-Bowers, C., Dinko, R.L. and Hart, R.G. (2005). Influence of a Shared Leadership Model in Creating a School Culture of Inquiry and Collegiality. *Journal of Research in Science Teaching* 42(1), 3–24.

Lai, M.K., McNaughton, S., Timperley, H. and Hsiao, S. (2009). Sustaining Continued Acceleration in Reading Comprehension Achievement Following an Intervention. *Educational Assessment, Evaluation and Accountability* 21, 81–100.

Lakshmanan, A., Heath, B.P., Perlmutter, A. and Elder, M. (2011). The Impact of Science Content and Professional Learning Communities on Science Teaching Efficacy and Standards-Based Instruction. *Journal of Research in Science Teaching* 48(5), 534–551.

Lave, J. and Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* London, UK: Cambridge University Press.

LeChasseur, K., Mayer, A., Welton, A. and Donaldson, M. (2016). Situating Teacher Inquiry: A Micropolitical Perspective. *School Effectiveness and School Improvement* 27(2), 255–274.

Little, J. W. (2002). "Locating Learning in Teachers' Communities of Practice: Opening up Problems of Analysis in Records of Everyday Work." *Teaching and Teacher Education* 18, 917–946.

Little, J. W. (2003). Inside teacher community: Representations of classroom practice. *Teachers College Record*, 105(6), 913 – 945.

Lofthouse, R. and Thomas, U. (2017). Concerning Collaboration: Teachers' Perspectives on Working in Partnerships to Develop Teaching Practices. *Professional Development in Education* 43(1), 36–56.

Lomos, C., Hofman, R.H. and Bosker, R.J. (2011). Professional Communities and Student Achievement – A Meta-analysis. *School Effectiveness and School Improvement* 22(2), 121–148.

Martin, W.G. and Gobstein, H. (2015). Generating a Networked Improvement Community to Improve Secondary Mathematics Teacher Preparation: Network Leadership, Organization, and Operation. *Journal of Teacher Education* 66(5), 482–493.

McConnell, T.J., Parker, J.M., Eberhardt, J., Koehler, M.J. and Lundeberg, M.A. (2013). Virtual Professional Learning Communities: Teachers' Perceptions of Virtual versus Face-to-Face Professional Development. *Journal of Science Education and Technology* 22, 267–277.

Mintrop, R. and Charles, J. (2017). The Formation of Teacher Work Teams under Adverse Conditions: Towards a More Realistic Scenario for Schools in Distress. *Journal of Educational Change* 18, 49–75.

Mintzes, J.J., Marcum, B., Messerschmidt-Yates, C. and Mark, A. (2013). Enhancing Self-Efficacy in Elementary Science Teaching with Professional Learning Communities. *Journal of Science Teacher Education* 24, 1201–1218.

Muijs, D. and Harris, A. (2003). Teacher Leadership – Improvement through Empowerment? *Educational Management and Administration* 31, 437–448.

Musanti, S.I. (2017). Challenging Inquiry and Building Community: Analyzing ESL and Bilingual Teachers' Narratives. *Action in Teacher Education* 39(3), 292–306.

Naicker, S.R. and Mestry, R. (2015). Developing Educational Leaders: A Partnership between Two Universities to Bring about System-Wide Change. *South African Journal of Education* 35(2), 1-11.

Ndlovu, M.C. (2011). University-School Partnerships for Social Justice in Mathematics and Science Education: The Case of the SMILES Project at IMSTUS. *South African Journal of Education* 31, 419–433.

Nehring, J.H. and O'Brien, E.J. (2012). Strong Agents and Weak Systems: University Support for School Level Improvement. *Journal of Educational Change* 13, 449–485.

Nelson, T.H. (2009). Teachers' Collaborative Inquiry and Professional Growth: Should We Be Optimistic? *Science Education* 93, 548–580.

Nelson, T.H. and Slavit, D. (2007). Collaborative Inquiry among Science and Mathematics Teachers in the USA: Professional Learning Experiences through Cross-Grade, Cross-Discipline Dialogue. *Journal of In-service Education* 33(1), 23–39.

Nielsen, W.S., Triggs, V., Clarke, A. and Collins, J. (2010). "The Teacher Education Conversation": A Network of Cooperating Teachers. *Canadian Journal of Education* 33(4), 837–868.

Nordgren, K., Kristiansson, M., Liljekvist, Y., and Bergh, D. (2019). *Lärares planering och efterarbete av lektioner: Infrastrukturer för kollegialt samarbete och forskningssamverkan*. Karlstad Sweden: Karlstad University Studies.

Norman, P.J., Golian, K. and Hooker, H. (2005). Professional Development Schools and Critical Friends Groups: Supporting Student, Novice and Teacher Learning. *New Educator* 1, 273–286.

Pella, S. (2011). A Situative Perspective on Developing Writing Pedagogy in a Teacher Professional Learning Community. *Teacher Education Quarterly* 38, 107–125.

Petticrew, M. and Roberts, H. (2006). *Systematic Reviews in the Social Sciences: A Practical Guide*, Malden M.A. USA, Oxford UK and Carlton Victoria Australia: Blackwell Publishing.

Peurach, D.J. and Glazer, J.L. (2016). Reading Recovery as an Epistemic Community. *Journal of Education for Students* Placed at Risk 21(1), 1–9.

Phelps, R. and Graham, A. (2008). Developing "Technology Together," Together: A Whole-School Metacognitive Approach to ICT Teacher Professional Development. *Journal of Computing in Teacher Education* 24(4), 125–133.

Piggot-Irvine, E. (2006). Sustaining Excellence in Experienced Principals? Critique of a Professional Learning Community Approach. *International Electronic Journal for Leadership in Learning* 10.

Plomp, T. and Nieveen, N. (Eds.) (2013). *Educational Design Research. Part A: An introduction*. Enschede: Netherlands Institute for Curriculum Development (SLO).

Ramnarain, U. and Schuster, D. (2014). The Pedagogical Orientations of South African Physical Sciences Teachers towards Inquiry or Direct Instructional Approaches. *Research in Science Education* 44, 627–650.

Richmond, G. and Manokore, V. (2011). Identifying Elements Critical for Functional and Sustainable Professional Learning Communities. *Science Education* 95, 543–570.

Riley, K. (2015). Enacting Critical Literacy in English Classrooms: How a Teacher Learning Community Supported Critical Inquiry. *Journal of Adolescent & Adult Literacy* 58(5), 417–425.

Roy, P. and Hord, S. (2006). It's everywhere, but what is it? Professional learning communities. *Journal of school leadership* 16(5), 490–501.

Ryan, J., Kang, C., Mitchell, I. and Erickson, G. (2009). China's Basic Education Reform: An Account of an International Collaborative Research and Development Project. *Asia Pacific Journal of Education* 29(4), 427–441.

Sales, A., Traver, J.A. and Garcia, R. (2011). Action Research as a School-Based Strategy in Intercultural Professional Development for Teachers. *Teaching and Teacher Education: An International Journal of Research and Studies* 27, 911–919.

Salleh, H. (2016). Facilitation for Professional Learning Community Conversations in Singapore. *Asia Pacific Journal of Education* 36(2), 285–300.

Santagata, R. and Guarino, J. (2012). Preparing Future Teachers to Collaborate. *Issues in Teacher Education* 21(1), 59–69.

Schabort, F., Sinnes, A. and Kyle, W.C., Jr. (2018). From Contextual Frustrations to Classroom Transformations: Female Empowerment through Science Education in Rural South Africa. *Educational Action Research* 26(1), 127–143.

Schneider, M., Huss-Lederman, S. and Sherlock, W. (2012). Charting New Waters: Collaborating for School Improvement in U.S. High Schools. *TESOL Journal* 3, 373–401.

Snow-Gerono, J.L. (2005). Professional Development in a Culture of Inquiry: PDS Teachers Identify the Benefits of Professional Learning Communities. *Teaching and Teacher Education: An International Journal of Research and Studies* 21, 241–256.

Sompong, S., Erawan, P., and Dharm-tad-sa-na-non, S. (2015). The Development of Professional Learning Community in Primary Schools. *Educational Research and Reviews* 10(21), 2789–2796.

Stoll, L., Bolam, R., McMahon, A., Wallace, M. and Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change* 7, 221–258.

Svanbjörnsdóttir, B.M., Macdonald, A. and Frímannsson, G.H. (2016a). Teamwork in Establishing a Professional Learning Community in a New Icelandic School. *Scandinavian Journal of Educational Research* 60(1), 90–109.

Svanbjörnsdóttir, B.M., Macdonald, A. and Frímannsson, G.H. (2016b). Views of Learning and a Sense of Community among Students, Paraprofessionals and Parents in Developing a School Culture towards a Professional Learning Community. *Professional Development in Education* 42(4), 589–609.

Swedish Government Official Report (2018:19). *Forska tillsammans – samverkan för lärande och förbättring.* Betänkande av Utredningen om praktiknära skolforskning i samverkan. SOU 2014:19. Stockholm: Norstedts Juridik.

Swedish Ministry of Education (2017) *Ökad Samverkan kring praktiknära forskning för stärkt vetenskaplig grund i skolväsendet*. Kommittédirektiv 2017:27. Utbildningsdepartementet.

Tan, Y.S.M. and Caleon, I.S. (2016). Problem Finding in Professional Learning Communities: A Learning Study Approach. *Scandinavian Journal of Educational Research* 60(2), 127–146.

Taylor, M.J., Hallam, P.R., Charlton, C.T. and Wall, D.G. (2014). Formative Assessment of Collaborative Teams (FACT): Development of a Grade-Level Instructional Team Checklist. *NASSP Bulletin* 98(1), 26–52.

van Ginkel, G., Verloop, N. and Denessen, E. (2016). Why Mentor? Linking Mentor Teachers' Motivations to Their Mentoring Conceptions. *Teachers and Teaching: Theory and Practice* 22(1), 101–116.

Vanderlinde, R. and van Braak, J. (2010). The Gap between Educational Research and Practice: Views of Teachers, School Leaders, Intermediaries and Researchers. *British Educational Research Journal* 36(2), 299–316.

Vescio, V., Ross, D. and Adams, A. (2008). A Review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education* 24, 80–91.

Vrasidas, C. and Solomou, M. (2013). Using Educational Design Research Methods to Examine the Affordances of Online Games for Teacher Learning. *Educational Media International*. 50(3), 192–205.

Wang, T. (2015). Contrived Collegiality versus Genuine Collegiality: Demystifying Professional Learning Communities in Chinese Schools. *Compare: A Journal of Comparative and International Education* 45(6), 908–930.

Wang, T. (2016). School Leadership and Professional Learning Community: Case Study of Two Senior High Schools in Northeast China. *Asia Pacific Journal of Education* 36(2), 202–216.

Wennergren, A-C. (2016). Teachers as Learners – With a Little Help from a Critical Friend. *Educational Action Research* 24(2), 260–279.

Whitney, A.E. (2013). When University Faculty Nurture Teacher Leadership: "Horizontal" Practices and Values in a Professor's Work with Teachers. *International Journal of Leadership in Education* 16(1), 71–93.

Wong, J.L.N. (2010). What Makes a Professional Learning Community Possible? A Case Study of a Mathematics Department in a Junior Secondary School of China. *Asia Pacific Education Review* 11, 131–139.

Wood, D. (2007). Teachers' Learning Communities: Catalyst for Change or a New Infrastructure for the Status Quo? *Teachers College Record* 109(3), 699–739.

Woodland, R.H. (2016). Evaluating PK-12 Professional Learning Communities: An Improvement Science Perspective. *American Journal of Evaluation* 37(4), 505–521.

Improving Teaching and Learning Together

This report reviews the research literature on professional learning communities (PLCs) in order to provide insights into of how practice-based research, in the form of various types of collaborative inquiry, could be promoted in ways that improve teaching and learning in Swedish schools. The review is based on research from many parts of the world, published in peer reviewed English-speaking journals and books. It thus has relevance beyond the Swedish context as well. The report presents research findings demonstrating the benefits of PLCs. It also describes the defining characteristics of these PLCs. Finally, it provides a research informed discussion of how PLCs could be developed and sustained, including suggestions that can inform future research. The report thus offers several important insights that can prove valuable to both researchers and policy makers seeking ways to develop teaching and learning in primary and secondary schools.

ISBN 978-91-7867-042-0 (print)

ISBN 978-91-7867-047-5 (pdf)

ISSN 1403-8099

RESEARCH REPORT | Karlstad University Studies | 2019:23