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Teacher Professional Development and Collegial Learning: A literature review through the lens of Activity System

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This study maps key features of effective Teacher Professional Development (TPD) and the framework of Communities of Inquiry (CoI), in an effort to gain an understanding of how these features contribute to teachers' collegial learning. Activity system, as described by Engeström (1987)/(1999), is used as a theoretical lens which allows for the visualization of TPD as a complex system. The result indicates that, apart from differences in the level of detail in the description of various features, there are differences in the demands the two models place on teachers. Establishing norms that promote collegial learning, in which critical inquiry is expected, emerged as a critical issue. This highlights the importance of viewing any variant of TPD as a process, in which the functions of features shift. Awareness of this process may prove important in designing and implementing future TPD initiatives.

Keywords: Activity Systems, Collegial learning, Communities of Inquiry, Teacher Professional Development

Introduction

In recent years, there have been calls for raised achievement in mathematics in a number of European countries, of which Sweden is one. In an effort to respond to these calls, the Swedish National Agency for Education (SNAE) launched several teacher professional development (TPD) initiatives, which build on the idea of collegial learning. SNAE describes collegial learning as activities in which teachers collectively and systematically analyse their teaching, in an effort to develop their practice and improve student achievement. Several studies have identified a shift in TPD where a traditional culture of viewing TPD as single occasions of "new knowledge being handed to teachers", is replaced by a new culture (e.g.Villegas-Reimers, 2003). Evaluations of the largest of these Swedish initiatives, Matematiklyftet [the Mathematics Lift], show that teachers, who have participated, have developed their ability to plan, carry out, and reflect on their teaching. What is left to investigate is in what way the various features of the initiative have contributed to this development (Österholm, Bergqvist, Liljekvist, & van Bommel, 2016). The question of what it is that makes TPD, and in particular, the kind of TPD which is based on ideas of collegial learning, effective, acts as a starting point for our study. We aim to explore this question through an inquiry into previous research on what makes TPD, in general, effective, but also by turning to a specific theory for collegial learning, Communities of Inquiry (CoI). In order to tackle the complexity of TPD as an endeavour we have turned to Cultural-Historical Activity Theory (CHAT). By using Engeström's model of activity systems (1999) we believe we can create a model of TPD and collegial learning that accounts for multiple dimensions, thus offering an opportunity to understand possible tensions between the two models of which the latter is part of the former.

Purpose and guiding research questions

By viewing TPD as an activity system, and categorize findings from previous research as parts of this system, we believe we can gain a comprehensive understanding of different aspects of collegial professional development. We hope that such insights will contain a problematization of prerequisites for TPD, which may prove helpful in future TPD initiatives. First, we investigate the question: *What characterizes effective professional development of teachers?* When we have mapped aspects of TPD, we look for differences between these and the corresponding aspects of the particular form of TPD known as *Communities of Inquiry*. The latter is expressed in the question: *What are the possible similarities and differences between general models for effective teacher professional development and Communities of Inquiry*?

Theory

Cultural-Historical Activity Theory (CHAT) is a theory that offers both an analytical and conceptual framework to understand human practices. The theory takes a social perspective on human actions and learning, meaning that human activities are understood in relation to their history, culture and context (Engeström, 1987). Within CHAT, Engeström (1987) has developed a model for analysis, which he calls activity system. An activity system is "the smallest and most simple unit that still preserves the essential unity and integral quality behind any human action" (p. 81). Activity systems have been used increasingly as a research framework in educational research in recent years (Gedera & Williams, 2016).

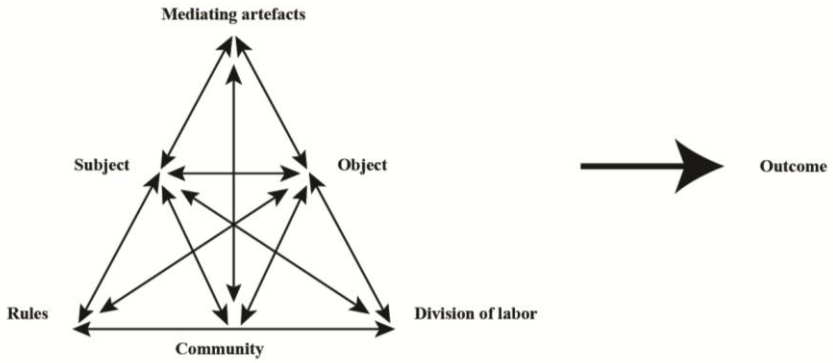


Figure 1: Activity system, as illustrated by Engeström (1999)

The activity system consists of six nodes as shown above. The *object* is the underlying "true" motive for the activity. *Subject(s)* are the participants who share the object of activity, for example teachers in a TPD-community. *Mediating artefacts* are the tools, with which the object is achieved. A tool can be a material object but also a procedure. *Rules* describe the rules and norms, both explicit and implicit, which are shared by the participants in the activity. *Community* refers to the context to which the subjects belong. This context may also include others, for example those who, in different ways, contribute to a shared object. *Division of labour* describes both the expressed roles of the subjects and the implicit hierarchical structures. To every activity system there is also an *outcome*, which can be defined as the change and/or result of an activity. A central aspect of CHAT is the analysis of tension within and between the nodes of the activity system. It is imperative to development

and learning, to identify such tensions. (Definitions are a synthesis of Engeström, 1987; Engeström, 1999).

Engeström (1987) stresses that an activity system can have any size, it may consist of one single person or an entire society. All those who share the object of an activity are part of the activity system. In educational research, the activity system has been commonly used as an analytical tool to interpret data, foremost for its usefulness in making the context of educational processes visible (e.g. Jaworski, 2009; Walshaw & Anthony, 2008). In this article, TPD is seen as one activity system.

Method

In our aim to investigate what research says about effective collegial TPD, we turned to literature in two different ways. 1) In order to identify key features TPD in general, we turned to studies, which implemented a meta-analysis of previous research. Meta-studies offer opportunities, not only for quick and easy access to numerous studies in a specific field, but also to take advantage of a synthesis aimed at highlighting, comparing or critiquing, the most prominent aspects of a particular phenomenon. It is, however, important to consider that meta-studies often lack the nuances and depth, which systematic reviews of existing literature, provide. To partly counter such drawbacks we chose meta-studies conducted by researchers, which we through extensive reading, perceived as prominent researchers in the field of TPD: Borko (2004), Desimone (2009) and Darling-Hammond, Hyler, and Gardner (2017). 2) The concept of TPD encompasses a number of different models for professional development. Collegial learning is a specific model for professional learning that has gained popularity in recent years. In Sweden, the model is the preferred model in national development initiatives. In order to compare the key features of TPD with research on collegial learning as a specific model for TPD, we chose to focus on the framework of Communities of Inquiry (CoI), as described by Garrison (2016), since this can be understood as a particular framework for collegial learning. To further anchor, the general framework of Garrison, in the context of mathematics education we also chose to include Jaworski's article on CoI in mathematics teaching development (Jaworski, 2008). Teacher learning and professional development are complex endeavours, which are difficult to grasp. In order to deal with this complexity we turned to Engeström's description of an activity system, consisting of six nodes. Viewing TPD as an activity system, allowed for the mapping of, not only the various concepts involved, but also the relations between these concepts. The activity triangle thus offered a visual, as well as analytical tool, with which we could manage the inherent complexity.

Viewing collegial TPD as one single activity system, which then constituted our unit of analysis, allowed us to explore the literature through the questions; what does research say about *the object, the subjects, the division of labor, the mediating artefacts*, etc. Salient features were noted in table 1. After having created an image of collegial TPD as a complete activity system, we explored each node looking for similarities, differences and possible gaps in our collective knowledge. Our aim is to provide insights into PD that will prove helpful in future initiatives.

Key features of an activity system for effective teacher professional development

In this section, key features of effective TPD as well as aspects of CoI are organized in relation to the nodes of the activity system. Similarities and differences found in each node are compiled in Table 1, and further presented in more detail under each of the headlines.

Node	Effective TPD	Communities of Inquiry
Subject	Teachers, facilitator	Teachers, facilitator
Object and outcome	Teacher learning, changes in practice	Better understanding of what is being questioned, developed thinking/reflection, inquiry is a way of being, connecting ideas/experiences and applying new ideas in practice. All the above lead to changes in practice
Mediating artefacts	Long term activities built on active learning, content focus related to subject matter knowledge, task with relevance for classroom practice	Questioning of practice or problems in practice as a starting point for critical discussions, sharing, comparing and developing experiences and ideas through critical discussions, exploratory working methods, inquiry as a tool, inquiry cycle
Rules	Collective support, trust, challenging/critical discussions, active learning	Critical review of experiences, ideas and results of teaching, exchange of experiences is not enough, inquiry as a way of being, open communication
Community	Teachers' beliefs and prior knowledge, school reforms	Social context; for example, educational content and communication medium
Division of labor	Facilitator foster norms of critical discussions, teachers act as active learners	Facilitator designs and organizes the meetings (structure and content), proposes tasks, keeps discussions focused, problematizes discussions, gives feedback and guides the teachers, teachers are inquirers who explore and analyse their teaching practice

Table 1: Similarities and differences between effective TPD and CoI

Subject

In all the three meta-studies, TPD initiatives are described as including more than one participant. This can be seen as a reflection of a focus on collective participation. Borko (2004) mentions teachers and facilitators as subjects, while Desimone (2009) and Darling-Hammond et al. (2017) mention only teachers as subjects in TPD. The teachers, together with a facilitator, are all participants in the framework of CoI (Garrison, 2016). Facilitators seem to have a more pronounced and central role in CoI than in research on effective TPD.

Object and outcome

Borko (2004) has investigated the impact of TPD on teacher learning whereas Desimone (2009) makes is clear that TPD should increase teacher learning *and* change practice to be seen as effective. It may be seen as unproblematic to view teacher learning as the object of the TPD activity system. Desimone's reference to a *change in practice*, however, highlights an uncertainty regarding what teacher learning entails. When it comes to CoI, Garrison (2016) argues that learning is manifested in teachers' different ways of thinking, reflecting and acting, which is the result of activities where the focus is on connecting different experiences and ideas, rather than just sharing them. Jaworski (2008) pinpoints this difference by arguing that the teachers, not only change their thinking regarding certain phenomena, but that they develop inquiry as a way of being, they are "taking the role of an inquirer; becoming a person who questions, explores, investigates and researches within everyday, normal practice" (Jaworski, 2008, p. 312). This indicates that the process of inquiry instead of being a means, turns into the object. Teachers who collectively act as inquirers, into their own teaching, have opportunities to tackle didactical and pedagogical challenges in a systematic and effective way.

Mediating artefacts

The mediating artefacts described in research of effective TPD can be categorized into three overall categories; 1) long term activities built on active learning (Darling-Hammond et al., 2017; Desimone, 2009), 2) content focus related to subject matter knowledge (Borko, 2004; Desimone, 2009) and 3) tasks with relevance for classroom practice (Darling-Hammond et al., 2017). The content focus limits the scope of the TPD, and acts as a guard against diversions and irrelevant questions, and it can therefore be seen as a mediating artefact. Darling-Hammond et al. (2017) argue for the importance of feedback and opportunities for reflection, while Borko (2004) is more explicit regarding the implementations when she proposes that classroom-material such as video recordings, student work and lesson plans, could be the starting point of professional development for teachers. In CoI there are more specific examples of mediating artefacts. For example Jaworski (2008) proposes that the long term activity should be designed as inquiry cycles where teachers plan lessons, act & observe, reflect & analyse and finally get or give feedback on the lessons. This cyclic process, where the questioning of practice is a starting point, can carry on for longer or shorter periods. Such a model offers a concrete tool to use in the TPD. In relation to the second category, Garrison (2016) proposes that the content should be focused on sharing, comparing and developing experiences and new ideas through critical discussions. To the third category, Garrison adds that the tasks should be exploratory in character. Jaworski uses the expression "inquiry as a tool" (p. 310) with which she argues that teachers need to use, for example, questions and exploratory methods to practice and develop inquiry as a way of being. What Jaworski (2008) and Garrison (2016) propose can be understood as a refinement of the more general categories found in research of effective TPD.

Rules

Norms concerning collegiality seem to be important in effective TPD (Borko, 2004; Darling-Hammond et al., 2017). Borko (2004) stresses the importance of trust, which enables challenging discussions on teaching, and she argues that this is one of the most important features of TPD. Desimone (2009) and Darling-Hammond et al. (2017), stress that teachers are expected to be active learners. In CoI, the importance of a critical review of experiences, ideas and results of the teaching, is stressed. This is something that goes beyond the mere exchange of experiences (Garrison, 2016; Jaworski, 2008). Garrison (2016) argues that norms of inquiry require open and risk free communication, where all participants can share ideas and experiences, without the risk of being ridiculed or attacked. Before such norms, of active learning, critical reviews and inquiry, are established however, they can be considered artefacts mediating learning, rather than part of a set of ingrained expectations. The rules and norms are quite similar between effective TPD and CoI. There is, however, in the case of TPD as well as CoI, a lack of description of how, and by whom, these rules and norms should be implemented and established.

Community

The participants in a TPD are also participants in other contexts where teacher learning and improvement of practice is the motive. Consequently, for TPD to be effective it must be in consonance with teachers' contexts, for example prior beliefs and knowledge (Desimone, 2009). Desimone also mentions the importance of coherence between the content of TPD and for example school reforms. In the same vein Garrison (2016) argues that individuals are inseparable from their context. Examples of elements of the social context, mentioned by Garrison, are educational content and communication medium. Aspects concerning community seem quite peripheral in research of both effective TPD and CoI, which indicates that the concept may not be well defined.

Division of labor

Desimone (2009) and Darling-Hammond (2017), which only mention teachers as subjects, argue that teachers need to be active learners, which could be understood as taking on a role. Borko (2004) describes the role of the facilitator, whose most important task is to foster trust and norms, which enable discussions. All three studies describe several key features such as time, active learning, norms of collegiality etc., but it is not clear, who is responsible for their implementation, or for upholding them, once they are established. According to CoI, the facilitator has a leading role. Garrison (2016) argues that the facilitator's task is to design and organize the activities, as well as to keep the conversations focused and exploratory in order to create rich and meaningful discussions. This could entail posing challenging questions, giving feedback or guiding teachers. The teachers are described as inquirers who participate actively in discussions, as well as explore and analyse their teaching practice. Garrison stresses that the teachers should be increasingly independent in the learning process. Although division of labor is described in more detail in CoI, concerning the role of the facilitator, little is said about how the facilitators should work to achieve this trusting, but also challenging, work environment. This points to an area where more research is needed.

Discussion

By using Engeström's (1987) activity system, we have tried to visually represent what research says about effective TPD and CoI.

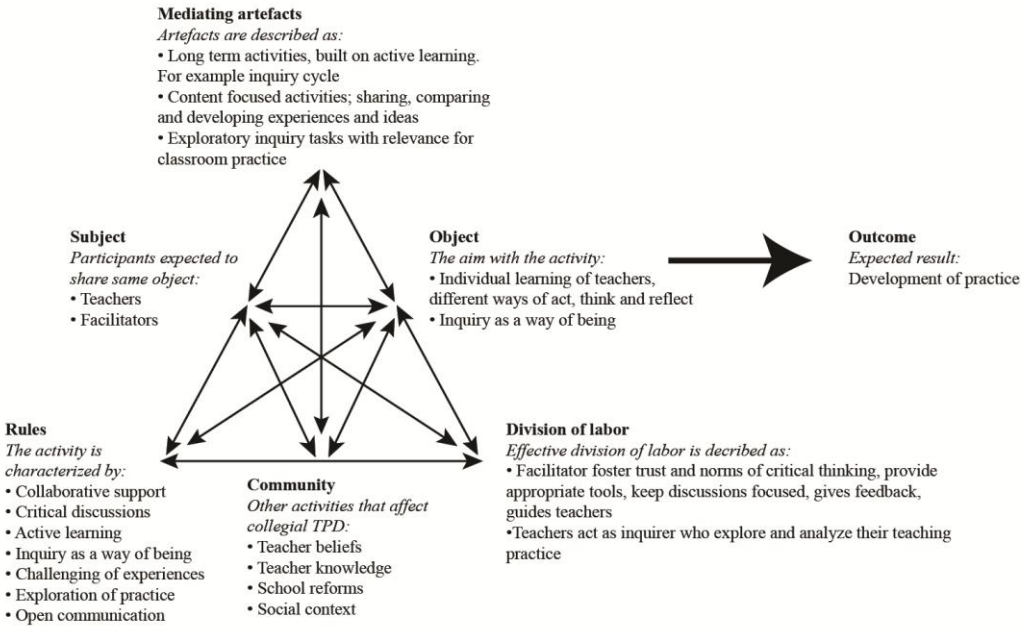


Figure 2: Activity system for effective collegial teacher professional development

Aspects of effective TPD and CoI, which have proved complex, are mainly those that can be sorted under the nodes: object, rules and, mediating artefacts. Some key features were sorted under more than one node in our categorization. Inquiry is positioned under each of these three nodes. This demonstrates the complexity of teacher learning, but also the flexibility of this framework. As the activity evolves the content of the nodes shifts, and creates a dynamic system. The activity system as an analytical framework thus has potential to identify different phases of the learning process. The inquiry process is an example of a process, which initially can be seen as a tool to foster changes in the way teachers approach a certain issue. When the tool however has become a part of teachers' natural approach, its function shifts and it can be seen as part of the rules and norms that govern the teachers' interaction. Jaworski (2008) argues that inquiry may be seen as a way of being and therefor can be seen as the object of TPD. CHAT as an analytic lens allowed us to view inquiry as a process, which can be found under the three nodes, object, rules or mediating artefacts, depending on what stage of a TPD initiative we are analysing. Theoretically, there is a considerable difference between viewing a process as a means or as a goal, which could generate what Engeström (1987) calls tensions in the activity. Empirically, however, it is natural that you can adopt a process by using it, by living through its different steps.

If the process of inquiry is viewed as a mediating artefact, something that can be used to achieve the goal of learning, then this is the aspect in which we find the greatest difference in detail, between previous research on TPD in general, and CoI. Inquiry, exploration and challenging of experiences are examples of concepts from CoI that refines some of the key features of effective TPD. Jaworski (2008) and Garrison (2016) stress that simply talking or

sharing experiences, is not enough for a collegial activity to result in learning. Collective, critical and systematic reviews and analysis of experiences and practice are crucial to building new collective knowledge and collegial learning. We believe this constitutes a tension, between a new collegial culture and a previous, more individually oriented culture. A culture, which no longer equates, passively acknowledging other's accounts of their teaching, with learning that informs and changes one's own practice, requires engagement from the teacher community. It places demands on the analytical and social skills of the participating teachers, on the pedagogical skills of the facilitator, and on the organization, that supports collegial work. In order for the teacher community to meet such demands, teachers as well as school administration need an awareness of the prerequisites for collegial learning that are highlighted in this article. In order for collegial learning to be successful, several important norms, such as trust and risk-free, open communication, must be implemented. Collectively asking questions about, investigate, or critically review, one's own practice requires a social environment, in which trust is considerable. Few examples are given on how the teachers and/or a facilitator should foster such norms. This is characteristic for many of the key features presented in figure 2. Research offers pointers on *what* and *who*, but very little is said about *how* the processes can be achieved. The processes leading to collegial learning is an area in need of more research.

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