

# **1 What Makes Teacher Professional Development Effective?**

# **A Literature Review**

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# INTRODUCTION

This chapter aims to explore what is currently known about the effectiveness of teachers' professional development (PD) programs or PD interventions on the quality of teachers, their teaching and student learning. *PD activities* refer to a wide range of activities in which teachers participate, such as information meetings, study days, 1-day workshops and training sessions; coaching and intervision; mentoring, classroom observations, participation in a network, offsite team training sessions, book and study clubs; and research projects. Most of the current PD activities can be characterized as traditional forms of PD. *Traditional* refers to the way PD was organized for the last decades: mainly through lectures, 1-day workshops, seminars and conferences, which were not situated at the workplace, in which teachers played a passive role, and in which the content was not adjusted to the problems and issues in the daily teaching practice. *Innovative forms* refer to all those interventions in which teachers do play an active role, and the issues in their own teaching practice determine the content. Some examples are collaboration of colleagues, study and book clubs, mentoring, coaching, intervision and research by teachers. It also includes the discourse on professional learning communities in which the emphasis is on the collective responsibility of teachers for the learning of their students and insights on teaching and PD (see also the chapter of Judith Warren Little in this volume; Borko, Jacobs & Koellner, 2010).

The distinction between traditional and innovative is rather normative in the sense that innovative would be better than traditional, even although empirical evidence for this assumption is still missing, as will be shown in this review. Besides, traditional forms are still used on a large scale, although there is also an increase of mixed forms. The current discourse views PD as more effective if the teacher has an active role in constructing knowledge and collaborates with colleagues, the content relates and is situated in the daily teaching practice and the possibilities

and limitations of the workplace are taken into account. However likely, these assumptions lack empirical evidence. Therefore, it is relevant to review what is currently known empirically on effective features of divergent PD interventions and on the school organizational conditions to successfully implement these interventions. So, the following questions guide the review study:

1. What is known about the effective features of interventions for PD?
2. What is known about the school organizational conditions of these PD interventions?

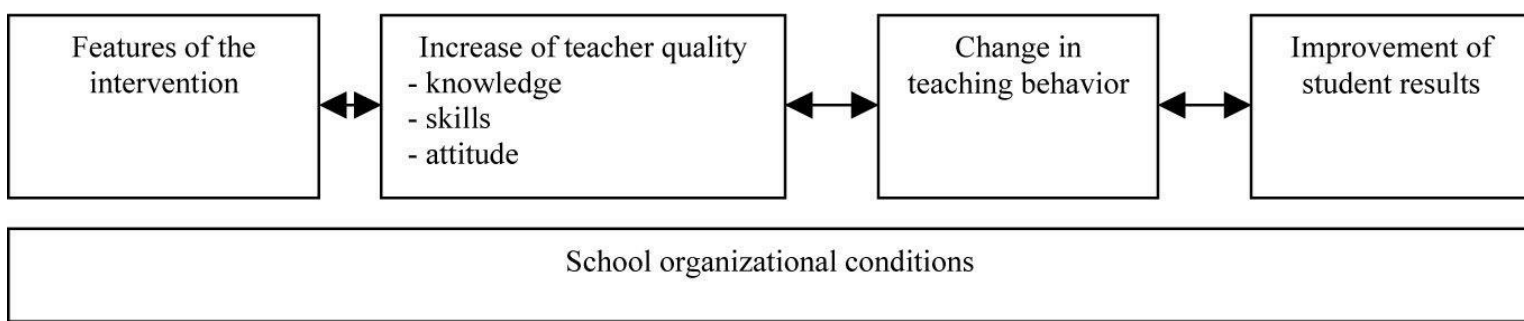
# THEORETICAL FRAMEWORK

Teacher PD in this chapter refers to those processes and activities designed to enhance the professional knowledge, skills and attitudes of educators so that they might, in turn, improve the learning of students (Guskey, 2000). The focus of the review are those activities explicitly designed for PD of teachers, which we describe as interventions for PD. More specifically, the focus is on those studies that report about effective features of PD.

When, however, is PD effective? Assuming the only relevant indication is increased student results, studies should focus on the relationships between the intervention and student results. If improving teacher behavior or teacher knowledge is the main goal of PD, then the focus should be relationships between the intervention and teachers' behavior or knowledge. However, if the assumption is that a change in behavior is always the result of a change in cognition, the focus should be the relationships between the intervention and the cognition, and perhaps also on teacher behavior. The same applies to the assumption that student results are the result of a change in teacher behavior or teacher cognition. Given different aims and assumptions behind concepts of PD effectiveness, it is essential to formulate the model this review uses to understand the effectiveness of PD.

As a main theoretical and organizing frame, this study applies Desimone's (2009) conceptual model for studying the effects of PD on teachers and students, based on an extended literature review. The model demonstrates interactive, nonrecursive relationships between (a) the critical features of PD, (b) teacher knowledge and beliefs, (c) classroom practice and (d) student outcomes (see [Figure 1.1](#)).

*Figure 1.1* Analytical framework for the study (based on Desimone, 2009).



The relationships between these elements are not linear per se, as often is the case, rather as integrated and dynamic (cf. Clarke & Hollingsworth, 2002). For instance, research shows that a change in teaching behavior can be caused as much by a change in teacher knowledge as a change in student behavior (Guskey & Sparks, 2004). Rather, it is essential to articulate the relationships between the different elements, which can be described as the ‘theory of improvement’ (Wayne, Yoon, Zhu, Cronen & Garet, 2008; Desimone, 2009). What is the intervention supposed to do? Who has to learn what, how and why? And what elements will result in an effective PD intervention? This theory of improvement can refer to three aspects: theory of change, theory of instruction and theory of context.

Theory of change refers to the assumed relationships between the features of the PD intervention and the change in teacher knowledge and/or change in instruction. Theory of instruction focuses on student results and refers to the relationships between the features of the PD intervention, the intended changes in teacher knowledge and instruction and the expected changes in student outcomes. Theory of context refers to the school organizational conditions necessary to implement and sustain successful PD in the school or in the classrooms. As Smylie (1995) observed, and more recently Little (2006) and Imants and van Veen (2010) confirm, most PD research hardly takes the conditions of the daily workplace into account, while these conditions strongly determine the opportunities and limitations of PD interventions.

Measurement is another important factor in effective PD interventions. Despite the recent focus on evidence-based practices, interventions that are hardly explored for their effect still dominate PD practice. As Hattie (2009, p. 2) summarized the general state of

educational research on these topics: “[T]he research evidence relating to ‘what works’ is burgeoning, even groaning, under a weight of such beautiful ‘try me’ ideas.” One of the reasons for this lack of evidence is the discussion about what is considered to be evidence.

Some argue that conclusions about causality and effectiveness can only be based on randomized controlled trials (cf. Slavin, 2008; Raudenbush, 2005; Wayne et al., 2008). Others argue that this approach is limited due to the underlying technocratic assumption, in which the effectiveness of the features of the intervention is the only relevant focus. Educational goals, which can strongly differ per school and teacher, can also determine effectiveness (Biesta, 2007). Others, while supporting the evidence-based approach, point to the risk of constructing lists of what works because it might “provide yet another set of recommendations devoid of underlying theory and messages” (Hattie, 2009, p. 3) or neglecting the specific features of the context.

These last issues seem to complicate the debate on effectiveness: Often it is only known what works in general, or only in very specific situations. So Raudenbush (2005) argues that randomized controlled trials are actually the only valid way to explore effectiveness, but it is not sufficient to understand why what works. Qualitative, small-scale case studies are therefore needed (cf. Little, 2006). And, as Raudenbush (2005) adds, (multiple) case studies are needed to provide working assumptions that can be tested in large-scale studies.

In addition, Verloop (2003, p. 208) notes that besides effectiveness studies, there are all kinds of educational and subject pedagogical theories and notions providing clear and insightful descriptions of educational processes that are the result of systematic thinking and research into teaching and learning. Although this body of knowledge provides no rigid empirical evidence about what works, it can be very relevant for teachers. So, to get an overview of what is known, this review will include both large-scale effectiveness studies and small-scale qualitative studies. The combination of both research approaches enables us to understand when and why and for whom an intervention is effective.

# **METHOD**

This review focuses on those activities that are explicitly designed for PD of teachers (referred to as PD interventions). An important criterion for inclusion of studies in this review is that researchers examined the effect of the intervention. As described earlier in the theoretical framework, effectiveness can refer to different elements of the analytical framework: teacher quality, teacher classroom behavior and/or student learning.



# Search Strategies and Criteria

Several search strategies were used to accomplish an extended overview of studies on the effect of PD interventions. We conducted literature searches with the use of ERIC, PsychINFO, Dissertation Abstracts, Sociological Collection, PiCarta and Google Scholar. Furthermore, we examined references of previous reviews. For this process of searching and analyzing a protocol was developed. This protocol included a list of search terms, which was partly based on previous reviews. The most important search terms were: teacher PD, teacher learning, in-service program, learning in the workplace, effects of PD, effective PD and more specific terms referring to learning activities and formats as coaching, mentoring, workshops, seminars, etc.

After an extensive exploration, it appeared that many studies conducted in the past 25 years have been summarized in a large number of review studies. Therefore, we decided to take these review studies as a starting point for the analysis. Next, we researched PD interventions conducted in the past 10 years (2000–2010) in addition to the existing overviews.

For the selection of the additional studies, the following criteria were used:

- The study needs to report on a PD intervention.
- The study needs to report on outcomes with respect to teacher learning or student learning, outcomes for teacher learning as well as student learning or even on the relation between teacher learning and student learning.
- The study has to be published in a peer-reviewed journal, in a dissertation or in a report commissioned by a renowned institute or government agency.
- Both quasi-experimental case studies and quantitative and qualitative studies are included as long as the method was elaborate and transparent enough in order to draw some

conclusions about effective features. We based this decision on weighing the methodology and the ‘impact’ of the results. Studies were scored on: (a) soundness/rigidity of methodology and (b) substantial qualitative or quantitative results.

- The study needs to add to previous studies in such a way that it concerns an intervention that has not been examined yet or it concerns a new design or method.

# **Content Analysis of Additional Studies**

Based on this first selection, we selected 11 reviews and 95 additional studies on PD interventions. We summarized all studies according to 22 aspects, such as: type of study, context, the content of the intervention, learning goals, ‘theory of improvement,’ the results, school conditions and how it can be placed in the ‘conceptual framework.’ Of the 95 additional studies it appeared that some studies did not offer enough information to learn more about effective features of the PD interventions. In the end, 34 studies on PD interventions remained for the more detailed analysis.

# **Input of Experts in the Field of Teacher Learning**

The aim of consulting various (international) experts in this field was to make sure that no important, not (yet) published or published reports were excluded in this review. In addition, the researchers used these consults to identify the most relevant studies and to discuss the results and conclusions.

# RESULTS

# A General Overview

The review brings together 11 major reviews and texts and 34 additional empirical studies on effective PD that cover the last 25 years of research on PD interventions. The 11 review texts are: Blank and de las Alas (2009); Borko et al. (2010); Desimone (2009); Hawley and Valli (1999); Kennedy (1998); Knapp (2003); Little (2006); Smith and Gillespie (2007); Timperley, Wilson, Barrar and Fung (2007); Vescio, Ross and Adams (2008); and Yoon, Duncan, Lee, Scarloss and Shapley (2007). Some of these reviews refer to each other or are based on some of the same studies, but some differ strongly in focus, and also in studies they chose to include. For instance, Timperley et al. includes studies from Australia, New Zealand and Europe, which are not mentioned in the other texts. Regarding the difference in focus, Yoon et al. selected only studies that are in line with the Clearinghouse Standards, while others are less concerned with these strict criteria and more focused on understanding the effectiveness of features (for instance, Kennedy, 1998; Little, 2006). Together they provide an impressive collection of the theoretical and empirical body of research of the last 25 years.

Furthermore, as a result of intensive research, we include 34 empirical studies of the last 10 years. Some of these studies comprise large-scale surveys, aiming at exploring general effects of PD interventions on teachers and students. The majority of the studies, however, explore the effects of one PD intervention. The interventions differ in duration from 3 months to 5 years, in composition from interdisciplinary teams to individual approaches and in type of education, from primary to vocational education. The topics for PD also differ strongly. Most interventions, however, have a duration of about 1 (school) year and aim at primary education in the United States. Other countries are France (Morge, Toczek & Chakroun, 2010), Switzerland (Vogt & Rogalla, 2009), Canada (Butler, Lauscher, Jarvis-Sellinger & Beckingham, 2004), Australia (Ingvarson, Meiers & Beavis, 2005) and the United Kingdom (James & McCormick, 2009; Stark, 2006). Four

studies were conducted in the Netherlands (Bakkenes, Vermunt & Wubbels, 2010; Hofman & Dijkstra, 2010; Ponte, Ax, Beijaard & Wubbels, 2004; Zwart, Wubbels, Bergen & Bolhuis, 2009).

The interventions emphasize subject matter, curriculum design, instructional strategies and student learning in a subject area and they often concern science subjects (like math and natural sciences) (Buczynski & Hansen, 2010; Chamberlin, 2005; Cohen & Hill, 2000; Desimone, Porter, Garet, Yoon & Birman, 2002; Doppelt et al. 2009; Ermeling, 2010; Fishman, Marx, Best & Tal, 2003; Franke, Carpenter, Levi & Fennema, 2001; Garet, Porter, Desimone, Birman & Yoon, 2001; Holmlund Nelson & Slavit, 2007; Kazemi & Franke, 2004; Lee, Hart, Cuevas & Enders, 2004; Lee, Lewis, Adamson, Maerten-Rivera & Secada, 2007; Morge et al., 2010; Norton & McCloskey, 2008; Saxe, Gearhart & Nasir, 2001; Supovitz & Turner, 2000; Telese, 2008; Vogt & Rogalla, 2009; Wallace, 2009).

Studies related to language education were less represented. The few studies concern language education in primary schools (Garet et al., 2008; Lee et al., 2007; Tienken & Achilles, 2003; Wilson, 2008), language education in secondary schools (Wallace, 2009) and language education in kindergarten (Domitrovich et al., 2009; Bierman et al., 2008; McCutchen et al., 2002). Two studies concern teacher networks (Hofman & Dijkstra, 2010; James & McCormich, 2009); one study pertains to an intervention with highly structured subject matter content and curricula (Domitrovich et al.; Bierman et al.). One study was conducted in special education (Butler et al., 2004).

The interventions that were studied are usually subject-matter-oriented summer schools or series of subject-matter-oriented workshops followed by a transfer to teachers' teaching practices. They come to light through teacher research (Buczynski & Hansen, 2010; Butler et al., 2004; Chamberlin, 2005; Desimone et al., 2002; Doppelt et al., 2009; Ermeling, 2010; Fishman et al., 2003; Hofman & Dijkstra, 2010; Holmlund Nelson & Slavit, 2007; James & McCormich, 2009; Kazemi & Franke, 2004; Lee et al., 2004; Levine & Marcus, 2010; Morge et al., 2010; Norton & McCloskey, 2008; Ponte et al., 2004; Saxe et al., 2001; Supovitz &

Turner, 2000; Wilson, 2008), participation in learning communities (Butler, et al.; Desimone, et al.), observing and experimenting in the classroom (Chamberlin, 2005; Zwart et al., 2009), coaching by in-service trainers in the classroom (Domitrovich et al., 2009), but also other forms. During this process, follow-up meetings are regularly organized. The amount of involvement of the in-service trainers (which are also often researchers) varies from a coach with a fair amount of distance from participants on the one end to a participating member of a learning community on the other end. Although most programs claim to be based on issues and concerns of teachers, it is striking that the idea of an expert trainer who determines what teachers should know or do and how they should learn is still dominant. Exceptions are forms of action research (e.g., Ponte et al., 2004; Stark, 2006) and working in professional learning communities as described in the review study of Little (2006; see also her chapter in this volume). More specifically, it concerns teacher networks, research teams in schools, lesson study groups, meetings on student work using a reflection protocol, collegial observation and video clubs. The discussion on professional learning communities and teacher research goes beyond 'deficit thinking' to provide guidelines for unraveling and solving daily recurrent problems in practice.

In general, there is a strong focus on subject matter, active and inquiry-oriented learning and professional learning communities. Nevertheless, (elements of the) traditional forms of PD are still in use.



# Methodological Problems

One of the results refers to the nature of the current research on effective teacher PD. Various factors complicate conclusions on what works. Assumptions about what constitutes valid research will determine whether these problems are classified as minor or major dilemmas. The problems are:

## *Teacher Quality As Primary Effect Size*

The analytical framework of this review distinguishes factors that can be affected by the intervention such as teacher quality, teacher behavior and/or student learning. In research on effective PD interventions it appears that the majority of the studies concern the relation between the intervention and teacher quality. To a lesser degree there are studies that examine the relation between the intervention and the quality of classroom behavior. Only a limited number of studies focused on the relation between PD interventions and student results (cf. Borko, 2004; Little, 2006; Loucks-Horsley & Matsumoto, 1999; Smith & Gillespie, 2007; Supovitz, 2001). Recently, studies on the relation between interventions, teacher and student outcomes are increasing (for example, Garet et al., 2008; Timperley et al., 2007; Yoon et al., 2007).

## *Effect Size*

Another problem is that most studies rely on self-reports of teachers (teachers' perceptions on possible effects and not more [quasi-] objective effect sizes like assessments, observations and student test scores). Well-known examples of studies that rely on self-reports are the large-scale

studies of Cohen & Hill (2000), Garet et al. (2001) and Kennedy (1998). These studies are cited in many reviews as empirical evidence for the positive effect of PD interventions on teacher quality (cf. Borko, 2004; Little, 2006). A recent exception is the large-scale study of Garet et al. (2008), which includes a ‘teacher knowledge assessment’ and also extended observations and student-scores (cf. for the limited amount of studies that incorporate student outcomes, Timperley et al., 2007; Yoon, 2007).

Furthermore, in many studies the effect size is too general to define the effects of the PD interventions (Hattie, 2009). In other words, there is incongruence between the goal of the intervention and the effect that is measured. However, studies aimed at measuring more specific effect sizes for a PD intervention are also increasing (as the majority of the 34 additional studies found in this review show).

### ***Lacking a ‘Theory of Improvement’***

In PD interventions the ‘theory of improvement’ often remains implicit. It often lacks a well-thought-out idea of how the form and content of intervention influence teacher learning (‘theory of change’) or student learning (‘theory of instruction’). This is problematic since research on PD intervention does offer lists of effective features but it is not clear in what way these features contribute to the effect of an intervention on teacher or student learning.

### ***Dominance of Research into ‘Traditional’ Forms of PD***

Another problem is that studies are lacking on the effectiveness of many innovative forms of PD. Most research concerns more traditional forms of PD like workshops, conferences and courses (cf. Borko, 2004;

Timperley et al., 2007; Wayne et al., 2008). Studies into forms of PD at the workplace, like coaching and mentoring, action research, study groups and teacher networks, often focus on the processes that take place during these interventions rather than on their effects.

## *Size of Studies*

Finally, in research on teacher learning a more general problem can be detected, which was identified by Borko (2004; Borko et al., 2010). There is an overload of (mostly qualitative) studies that examine one program or intervention in one specific setting (type 1 studies in terms of Borko). Fewer studies examine one specific intervention and features in several settings with several coaches (type 2 studies). Largely missing is research in studies featuring several interventions in more than one setting, with several coaches (type 3 studies). The latter two types of research are necessary to draw valid, reliable and generalizable conclusions.

In type 1 studies it is impossible to define which features of an intervention are relevant and in what way. For example, many studies argue that coaching can be effective, but often it is not clear how many hours should be invested in the coaching. The number of hours is important since they require a financial investment that affects the number of hours that are available for working with students.

The general problem, which Borko (2004) and Wayne et al. (2008) point out, is that most of the research on PD interventions is not complete, generalizable, precise or valid enough. In this respect, Wayne et al. discuss the distinction between ‘efficacy trials’ and ‘effectiveness trials.’ With ‘efficacy trials’ they refer to studies that focus on one PD intervention aimed at contributing to the PD of teachers, whereas ‘effectiveness trials’ comprise studies where PD interventions are tested in numerous diverse settings. The latter type of studies can be highly relevant for developing knowledge about features and effects of PD. In

their review of studies on the relation between teacher PD and student results, Yoon et al. (2007) found that only 9 studies of 1,300 studies in total meet these criteria. Regarding the 34 additional studies found in the current review, most are type 1 studies, except for Desimone et al. (2002); Ingvarson et al. (2005); James & McCormich (2009); McCutchen et al. (2002); Saxe et al. (2001); Supovitz & Turner (2000); and Telese (2008).

Apparently, it is impossible to draw rigid conclusions about ‘what works’ in PD interventions. Nevertheless, Borko et al. (2010, pp. 548–549) argue that there is “a growing consensus within the field regarding the central features of PD that are effective in improving teaching practice” (cf. Wayne et al., 2008). This makes a review on the effects of the different PD interventions less significant compared to a review of what is known about features of effective PD in general. Those features should be regarded as *indications* for what works. This list of features can be used to design, implement and evaluate specific forms of PD.

# Effective Features

In the following, we present an overview of effective features based on an analysis of 11 review studies and 34 intervention studies. Features described by Kennedy (1998) form the starting point of the analysis. We then compared the list of these features to other review texts and additional studies and adjusted or complemented.

## *Design: Traditional Versus Innovative*

The distinction between more traditional and more innovative designs of a PD program does not necessarily seem meaningful when distinguishing between effective and ineffective PD programs. This is because empirical research underpinning that one design is more effective than the other design is still lacking. Although there is a growing consensus that PD programs situated at the workplace are more fruitful, there is (still) no empirical evidence that supports this consensus. Also, the research into individual PD interventions does not show specific designs to be more effective than others (Garet et al., 2001; Smith & Gillespie, 2007). Teacher effects are found for both more traditional designs (e.g., 1-day courses and visiting lectures at conferences) as well as for more innovative designs (e.g., coaching and study groups).

What seems to be more relevant is the perceived relevance and usefulness of the program with respect to teachers' daily work: "Quality professional development engages teachers in inquiry about the concrete tasks of teaching, assessment, observation, and reflection, and provides them with the opportunity to make connections between their learning and their classroom instruction" (Borko et al., 2010, p. 549). There is hardly any research that demonstrates that this qualitative PD can only be realized 'on-site' or only within innovative designs of PD programs.

## ***Content Focus***

An effective feature of PD programs that appears in many studies—and is even considered most relevant in some studies—is the content focus of the program. The content of the intervention should be related to classroom practice, more specifically to subject content, pedagogical content knowledge and student learning processes of a specific subject. When teachers develop with respect to these aspects of content, an increase in teacher quality and student learning results. This is in line with findings from research into features of effective teachers. Effective teachers master the subject content and are capable of explaining this content to students in a way that students do understand and learn (Scheerens & Bosker, 1997).

In addition, understanding the processes of student learning increases the quality of education and student achievement. For instance, in a more recent form of PD teachers together analyze student work and student test results in order to get more insights into how their students learned and understood the content.

## ***Quality of the Content Provided***

Multiple studies underpin the need for the provision of theory-based content and well-researched (evidence-based or evidence-informed) methods and practices (Buczynski & Hansen, 2010; Bierman et al., 2008; Domitrovich et al., 2009; Yoon et al., 2007). Examples of learning and teaching in a PD program should be powerful and clear, intellectually challenging, and exceptional (not a routine example) (Knapp, 2003). Furthermore, there should be a provision of permanent access to newly developed knowledge and expertise of colleagues within and outside the teacher's own school (Little, 2006).

## *Active and Inquiry-Based Learning*

Another critical feature has to do with the actual activities teachers should undertake in PD programs. In almost all studies, opportunities for teachers to take part in active learning link to effective PD. Active learning, as opposed to passive learning (e.g., listening to a lecture), takes form in observing expert teachers or being observed by other teachers followed by feedback and discussion, or reviewing student work. Nowadays, active learning is more and more understood as similar to inquiry-based learning. Almost all studies report on ‘inquiry-based’ elements incorporated in the design of the PD program. Those elements range from analyzing student data, performing research activities with respect to practice-related content such as student work, learning problems of students or innovative curricula. In these studies, inquiry-based activities do not necessarily mean that teachers are actually performing research themselves—as is the case in developments as the ‘teacher as researcher.’ Rather, teachers are actively engaged in order to learn in the context of the PD program.

## *Collective Participation*

A feature closely connected to active learning is collective participation and collaborative teacher learning. It concerns collaborations between teachers from the same school, grade or department. “Such arrangements set up potential interaction and discourse, which can be a powerful form of teacher learning” (Desimone, 2009, p. 184). Another aspect of collective participation emphasized in literature on professional learning communities is the importance of a shared responsibility of the teachers for their own PD (Little, 2006). Teachers need to be involved in setting the goals of a PD program but also in choosing content and design of the PD intervention (Hawley &

Valli, 1999) in order to increase both the effectiveness as well as the usefulness of the PD program.

### *Duration and Sustainability*

Another feature often mentioned with respect to effective PD is duration: “Research shows that intellectual and pedagogical change requires PD activities to be of sufficient duration, including both span of time over which the activity is spread (e.g. 1 day or one semester) and the number of hours spent in the activity” (Desimone, 2009, p. 184). It is difficult to identify an exact ‘tipping point’ since it always depends on the type of activity. Findings from the review of Yoon and colleagues (2007) show support for at least 14 hours of training. Desimone (2009) comes up with a minimum of 20 hours, but Supovitz and Turner (2000) indicate a minimum of 80 hours of training for teacher behavioral change to occur. On the other hand, research from Telese (2008) shows that too many hours of PD can be ineffective. What all these studies bring to the fore is that a substantial amount of time (both span of time and actual hours) is necessary in order for PD to be effective.

In many studies work pressure is a frequently mentioned problem related to PD. Often there seems to be too little time for development. There will be further discussion of this problem in the section on school organizational conditions. A different aspect of duration has to do with the notion of sustainability of the intervention (cf. Desimone, 2009; Yoon et al., 2007). This means that one-shot, short-term interventions might be less effective than long-term interventions combined with enduring follow-up support (i.e., follow-up interventions, permanent support of group collaboration and ongoing facilitation of teacher learning).

### *Coherence*



A feature increasingly emphasized in the literature is coherence: “the consistency of school, district and state reforms and policies, with what is taught in PD” (Desimone, 2009, p. 184). This might prevent the PD program from becoming perceived as an isolated endeavor in the school and therefore help to improve the sustainability of the effects of the program. Another important aspect of coherence is the extent to which the goals, content and design of the PD program are consistent with teachers’ knowledge and beliefs. Knapp (2003) advises linking PD to ongoing innovations, but also to specific problems the teachers experience in their daily work, including external pressure most innovations bring along (cf. Blank & de las Alas, 2009; Borko et al., 2010; Desimone, 2009; Hawley & Valli, 1999; Little, 2006; Smith & Gillespie, 2007; Timperley et al., 2007).

## *Theory of Improvement*

Recent research shows more and more support for the necessity of a well-defined and explicit understanding of the relation between specific features of the intervention and the intended learning goals, the ‘theory of improvement.’ This understanding must comprise both teacher learning (‘theory of change’) as well as student learning (‘theory of instruction’) (Desimone, 2009; Yoon et al., 2007).

# Organizational Conditions

In a limited number of studies on teacher learning, school organizational conditions that contribute to the success and sustainability of a PD intervention are included. In most studies on effective teacher PD this is not the central focus. They merely focus on the relation between features of the intervention and the effectiveness in terms of teacher or student learning. The school organizational dimension was also neglected in most studies on teacher PD. The same applies, however, for school organizational research on learning in the workplace, organizational learning and professional learning communities, in which insights from research on teacher PD are hardly used. Recently, this seems to be changing (e.g., Smylie, 1995; Imants & van Veen, 2010).

Some studies point to the importance of leadership or creating a professional learning community in general (cf. Desimone, 2009; Ermeling, 2010; James & McCormick, 2009; Timperley et al., 2007). Other studies argue that a sufficient amount of time is important (Buczynski & Hansen, 2010; Lee et al., 2004; Norton & McCloskey, 2008; Stark, 2006; Vogt & Rogalla, 2009; Wilson, 2008), but they almost never elaborate on the implications of such conditions for the daily schedule of a school and teachers' workload.

The feature that an intervention should be consistent with the school, district or state policy should also be incorporated with school organizational conditions.

A few studies discuss school organizational conditions in more detail. For example, Smith and Gillespie (2007) extensively describe the culture and structure of the organization, the working conditions for teachers and schoolwide expectations and incentives to use new teaching practices. Also, Little (2006) discusses rather extensively the importance of a culture in which teachers themselves and school management consider teacher learning relevant. Little also stresses the importance of leadership and a shared focus of teachers on vision, responsibility, decisions, working and learning.

Other examples are Zwart et al. (2009), who in the context of peercoaching interventions point to the significance of a safe learning culture in the school and the problem of relatively short periods in a year that teachers have time to learn. Holmlund Nelson and Slavit (2007) also refer to this problem when they point out that executing a research cycle often does not coincide with the duration of a school year. In this context, Ermeling (2010) stresses the importance of “dedicated and protected times to meet on a regular basis to get important work done.”

In research on professional learning communities, developing and having a shared vision, shared responsibility, shared approach, shared reflection and shared influence are emphasized. This requires a focus on learning, mutual trust and shared norms for giving peer feedback (Little, 2006).

In general, it can be argued that organizing teacher learning in a school needs to be well thought out. Many initiatives in this domain are not successful. Projects are often temporary and not sustainable. Furthermore, they often take place in isolation with only a limited number of teachers involved instead of an entire school team.

Another, perhaps more important, reason for a well-thought-out plan for teacher learning is that most schools are not set for teacher learning. They are established for student learning and teacher work. Teacher learning requires a different design, culturally and structurally. The majority of a week at school is filled with lesson hours, time to prepare lessons or to work on student-related matters. The time that remains for PD activities is scarce and often not ideal for learning. For example, there are schools where teachers have time for PD activities on Friday afternoons after the final lesson hour. Or most schools consist of mainly classrooms, one staff room and maybe department workspaces—a structure more aimed at student learning than teacher learning.

In general, school culture and structure place less emphasis on teacher learning simply because student learning and achievement are the primary concern. School organization literature and research on learning at the workplace, organizational learning and professional learning communities provide some valuable suggestions and ideas for this

purpose. In research on organizational learning, for example, concepts like leadership, organizational climate, teacher collaboration and agency are elaborated (Sleegers & Leithwood, 2010). In research on learning at the workplace five factors are distinguished:

1. the learning potential of the task
2. possibilities for feedback, evaluation and reflection on activities
3. formalizing work processes
4. teacher participation in dealing with problems and designing and developing work processes
5. learning resources (Ellström, 2001; Imants & van Veen, 2010)

It is important to note that these organizational features are not objective facts, but they are defined by the way in which teachers and school leaders make sense of these conditions (Imants & van Veen, 2010; Sleegers & Leithwood, 2010).

These organizational conditions primarily show that attending to teacher learning in schools requires a different way of thinking, namely, taking the structural and cultural possibilities and constraints for teacher learning in the entire organization into consideration. This can have farreaching implications, which if not taken into consideration, may explain the failures of many initiatives. A relevant example in this respect is a recent study into the development of about 200 schools in Chicago, revealing that teacher learning can be organized successfully if it occurs consistently and is supported by committed leadership, a student-centered learning climate and professional learning capacity of the schools: “[I]t entails coherent, orchestrated action across all essential supports” (Bryk, 2010, p. 25; Bryk, Sebring, Allensworth, Luppescu & Easton, 2010).

# CONCLUSIONS

The central aim of this chapter was to provide an overview of what is currently known about the effectiveness of teachers' PD programs or PD interventions on the effectiveness of teachers, the quality of their teaching and student learning. The chapter is based on a systematic exploration of empirical studies on the effects of divergent PD interventions.

A first set of conclusions refers to the nature of the current research on effective teacher PD. Some problems exist that complicate the conclusions on what works. Besides some methodological and conceptual issues, the most urgent problem is the overload of (mostly qualitative) studies that examine one program or intervention in one specific setting. Fewer studies examine one specific intervention in several settings or several interventions in several settings, with different coaches. Such studies are necessary to draw valid, reliable and generalizable conclusions. Apparently, no rigid conclusions can be drawn on 'what works' in PD interventions or on specific interventions. What remains possible, however, is to describe what is known about effective features of PD in general, which should be regarded as *indications* for what works.

A second set of conclusions refers to the effective features of teacher PD. The most relevant and striking feature refers to the content: It is important to focus on the daily teaching practice, more specifically, the subject content, the subject pedagogical content knowledge and the students' learning processes of a specific subject. Furthermore, there is still hardly any research showing that PD situated in the workplace would be more effective than offsite PD. Other relevant features are active and inquiry-based learning, collegial learning, a substantial amount of time, cohesion with the school policy and or national policy and at the same time a congruence with the problems teachers experience in their daily teaching practice. In the case of all of these features, a theory of improvement is relevant: knowing how the specific features stimulate the

learning of teachers and/or their students. Finally, it is relevant to consider the school organizational implications to ensure that the PD is relevant, successful and sustainable. Schools are mainly designed for student learning and for teachers to work, rather than for teachers to learn.

To conclude, there seems to be a large degree of conceptual saturation regarding the effective features in general. What is lacking is a more precise operationalization of these effective features in specific situations and contexts. Furthermore, the set of effective features described in this chapter shows a need for well-designed PD interventions, in which teachers' learning goals and their daily teaching practice are central, teachers are actively involved in the learning process and are sustainable over time. In other words, there is a strong need for teacher learning that matters. The following chapters provide examples of such interventions.

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