CHAPTER 2

# Enhancing educational effectiveness through teachers' professional development

## 2.1 Introduction

The TALIS survey provides information on the form, content and contextual conditions of teacher professional development in 24 countries. In addition, it gives information on teachers' characteristics, such as age, experience, formal qualifications and the school setting. Apart from professional development, the survey addresses three other substantive areas: teacher appraisal and feedback, teaching practices beliefs and attitudes, and school management.

This chapter uses a broad concept of teachers' professional development to summarise the relevant literature and guide an analysis of the TALIS data set. The research referred to in this chapter includes studies on primary and lower secondary education. Although the term "professional development" is frequently reserved for "continuous professional development in schools", professional development is viewed here as the body of systematic activities to prepare teachers for their job, including initial training, induction courses, in-service training, and continuous professional development within school settings. This last category is viewed as a form of continuous on-the-job training located in school settings (Table 2.1).

**Table 2.1. Professional development broadly defined**

| Professional development |
|---|
| • initial training<br>• induction courses<br>• in service training<br>• continuous professional development in school settings |

When this definition of professional development is compared to the definition used in the TALIS survey (OECD, 2009, p. 49), the perspectives seem similarly broad: "Professional development is defined as activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher". In terms of the actual content of the study, all the elements of Table 2.1 appear to be included, except initial training. This chapter includes research results on the effects of initial training in the literature review to complete the picture of the impact of training and ongoing professional development.

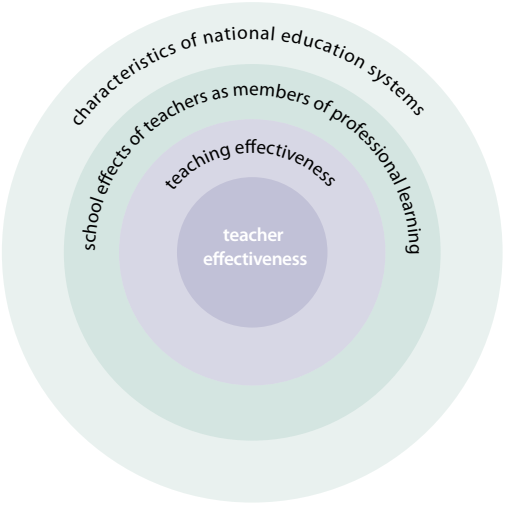
The literature review takes a performance-oriented perspective, with an emphasis on the meaning of professional development for the quality of education, in the sense of fostering educational performance and educational effectiveness. First, this represents the perspective of the TALIS study. Second, it is important to see teachers' professional development as a means of attaining the basic goals of the educational endeavour. It also acknowledges the relevance of intermediary goals, such as enhancing teachers' job satisfaction.

This perspective goes beyond seeing professional development as an end in itself and thus seeks to avoid goal displacement.

Of course, there are other ways to study the professional development of teachers – in relation to their career development, as a specific province of education, or for its specific didactic challenges, such as the fact that it is an application of adult learning. However, a performance-oriented perspective appears to encompass all of these facets, while remaining targeted at the enhancement of educational quality.

"Teachers matter" seems to be the number one truism in educational discourse. Yet, surprisingly, when it comes to explaining how teachers matter, the evidence-based picture is far less clear. For example, Rivkin, Hanushek and Kain (2005) conclude that "teachers have powerful effects on reading and mathematics achievement, though little of the variance in teacher quality is explained by observable variables, such as education or experience". This chapter opts for treating teachers' professional development in a context of educational quality and seeing professional development as instrumental to student learning and educational achievement. It examines the research literature on teacher effectiveness to identify critical variables that distinguish effective from less effective teachers. Teacher effectiveness is a first layer (Figure 2.1) in which teachers' characteristics, including their beliefs and competencies, could be enhanced by training and professional development. Next, in the area of teaching effectiveness, the state of the art in instructional effectiveness research is discussed in order to identify components of effective teaching repertoires. A further layer covers teachers co-operating in work teams in the school context. At this level teachers' impact appears in their contribution to effective structures and climates of schooling. Finally, in Chapter 3, some tentative ideas of characteristics of national educational systems that may influence professional development arrangements, such as the degree of autonomy and the operation of accountability and evaluation mechanisms, are considered.

**Figure 2.1. Layers of analysis in identifying contents and forms of teachers' professional development**




The conceptual framework developed in this chapter serves as a background to the analysis of the TALIS data on teachers' professional development. It points at interesting associations of the descriptive material on the form and content of professional development as described by the TALIS survey, with characteristics of individual teachers, the school context and the national education context. In practice, variables regarding school context, teacher background and teaching processes were all included in the TALIS survey; only data on the national context of the participating countries were not included.

Sections 2.2, 2.3 and 2.4 focus on the most relevant content of teacher training and professional development, by analysing the research literature on teacher and teaching effectiveness. These sections look into teacher characteristics such as personality, subject matter mastery, pedagogical skills, and knowledge of pedagogical content as well as varied teaching repertoires.

Section 2.5 on continuous professional development in schools has a particular emphasis on the basis of co-operation within school teams, peer review and human resources development.

Relevant dimensions of the national educational context for teacher training and professional development are treated in Chapter 3. This chapter also provides a brief summary of the state of affairs concerning professional development in European countries, on the basis of reports from the European Commission, the OECD and EURYDICE.

## 2.2 Teacher effectiveness

### Overall effects

The typical size of teacher effects in Dutch primary schools, expressed in terms of variance components, is shown in Table 2.2. In that study the teacher effect could be estimated because in about half of the schools, teachers changed from grade 7 to grade 8, while in the other half students in grades 7 and 8 had the same teacher. The results reinforce outcomes of other studies in which some three-quarters of the school effect could be explained by teacher effects (Luyten, 1994). This "gross" effect of teachers – in other words, students taught by one teacher rather than another – is sizeable, as was also noted by Rivkin, Hanushek and Kain (2005). The next challenge is to explain this overall effect by means of observable teacher characteristics.

**Table 2.2. Teacher effects in terms of variance components**

| | Mathematics achievement | | Language achievement | |
|---|---|---|---|---|
| | Teacher effect NOT included | Teacher effect included | Teacher effect NOT included | Teacher effect included |
| Differences between classes/ schools | 13.4% | 4.7% | 3.7% | 0.0% |
| Teacher effect | --- | 13.5% | --- | 6.1% |
| Differences between students | 42.5% | 46.8% | 30.7% | 32.7% |
| Grade level variance | 44.1% | 35.0% | 65.6% | 61.2% |

*Source*: Luyten and Snijders, 1996.

### Personal characteristics of teachers

Throughout the history of teacher and teaching effectiveness research, characteristics of teachers' personality have been investigated using variables such as flexibility/rigidity, extraversion/introversion, locus of control, self-efficacy, general and verbal intelligence (Brophy, 1983; Darling-Hammond, 1999).

In the 1960s and 1970s the effectiveness of certain personal characteristics was particularly studied. Medley and Mitzel (1963), Rosenshine and Furst (1973) and Gage (1965) are among those who reviewed the research findings. These studies found hardly any consistency between a teacher's personal characteristics, such as being warm-hearted or inflexible, and pupil achievement. More recently, Darling-Hammond (1999) concluded that the effects of general intelligence are inconsistent and small, but that some studies have convincingly demonstrated a positive impact of verbal ability.

Since the degree to which such personality characteristics are amenable to training is debatable, this area is not further addressed in this review.

### Formal qualifications and experience

Effects of teacher education – usually expressed in terms of formal qualifications such as a BA or MA degree, or being certified to teach in a specific field – have traditionally been included in "education production functions". In industrialised countries, formal qualifications do not appear to make much difference. In developing countries they more often appear to be significant. The explanation is probably that there is little variation in formal teacher training in developed countries, and teachers are more or less uniformly equipped to carry out their job. In developing countries teacher preparation is less uniformly distributed. One might say that in developed countries, cross-sectional and comparative studies doe not show a strong impact from teacher education because there is a lack of variability in the variable of interest. The larger impact of teacher education in developing countries is illustrated in Table 2.3 which combines results from two meta-analyses.

**Table 2.3. Percentages of studies with positive significant associations between resource input variables and achievement in industrialised and developing countries**

| Input | Industrialised countries % sign. positive associations | Developing countries % sign. positive associations |
|---|---|---|
| Teacher/pupil ratio | 15% | 27% |
| Teacher's education | 9% | 55% |
| Teacher's experience | 29% | 35% |
| Teacher's salary | 20% | 30% |
| Per pupil expenditure | 27% | 50% |

*Source:* Hanushek, 1995, 1997.

These results are somewhat corroborated by US studies of alternative certification of teachers, *i.e.* other than official full teacher qualifications, as well as studies of out-of-field teaching (teaching a subject for which a teacher holds no official qualification). Wayne and Youngs (2003) summarised studies by Goldhaber and Brewer (1997 and 2000) and noted that for mathematics, results of fully certified teachers were better than those of teachers who were not formally qualified or were alternatively qualified. Similar results were not confirmed for other subjects. In a study using state level data from the United States, Darling-Hammond (1999), used a finer scale of teacher qualification, distinguishing between:

- teachers with full certification and a major in their field
- teachers with full certification
- teachers less than fully certified
- uncertified teachers.

She found substantial positive effects for certified teachers and substantial negative effects for uncertified teachers (correlations of the order of .71 to -.51).

Results of studies investigating the effects of teacher experience do not always show the expected positive effect. According to Darling-Hammond (1999, p. 9) effects are not always significant or linear. Effects of experience are particularly visible when teachers with less than five years of experience are included in the study.

## Subject matter knowledge and knowledge about teaching and learning

The most frequently used analytical variables when attempting to explain why some teachers are more effective than others are mastery of subject matter and pedagogical knowledge. In the more recent research literature, an interactive construct, combining the two, namely "pedagogical content knowledge" appears to show promising results.

Darling-Hammond (1999) refers to studies which have correlated teachers' courses in subject matter areas and scores on subject matter tests with student achievement. She concludes that the former show positive effects more frequently than the latter. Low variability in test scores is seen as the main reason for low and insignificant associations. Mastery of subject matter is seen as a basic requirement that is relatively uniformly addressed in initial teacher training. In this sense the explanation of the results in this area is the same as that for overall teacher education effects. Hawk, Coble and Swanson (1985) found that the relation between teachers' training in science and student achievement was greater in higher-level science courses.

Darling-Hammond (1999) lists some ten studies indicating that pedagogical training generally has a stronger effect than subject matter mastery. It should be noted that most of the studies referred to look at teaching methods related to subject matter. As suggested by Byrne (1983), subject matter mastery is likely to interact positively with knowledge on how to teach the subject. Wayne and Youngs, on the other hand, present results showing that pedagogical training in language teaching appeared to lower student achievement.

## Pedagogical content knowledge

In his seminal article in the *Education Researcher*, Lee Shulman (1986) criticised the sharp division between subject matter mastery and teachers' pedagogical skills. He introduced the concept of pedagogical content knowledge, briefly described as "subject mat-

ter knowledge for teaching". Pedagogical content knowledge is about selection of topics, useful forms of presentation, analogies, illustrations, examples, explanations and demonstrations. Pedagogical content knowledge also includes understanding of what makes the learning of specific topics easy or difficult, including knowledge about conceptions and misconceptions that students bring to the subject. The assumption is that "deep knowledge" about the content and structure of a subject matter area is the crucial precondition for teachers' reliance on pedagogical content knowledge in their teaching. Additional components sometimes included in the concept are knowledge of the appropriate use of teaching materials and media, as well as strategic knowledge on the application of teaching strategies.

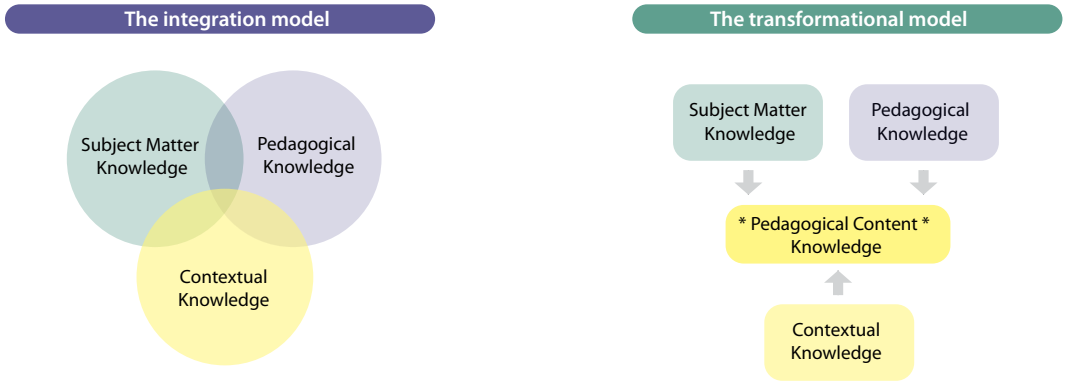
Krauss *et al.* (2008) define three main components of pedagogical content knowledge:

- knowledge of tasks
- knowledge of students' prior knowledge
- knowledge of instructional methods

These authors measured pedagogical content knowledge by means of an assessment centre type of approach, in which teachers rated real-life teaching scenarios in mathematics classes. Their results gave a basis for the hypothesis that teachers with more pedagogical content knowledge display a broader repertoire of teaching strategies for creating cognitively stimulating learning situations. Another interesting outcome was that, particularly at higher levels in the German Gymnasium, pedagogical content knowledge was highly correlated with subject matter mastery, thus suggesting that deep knowledge of the subject matter is indeed the critical precondition for pedagogical content knowledge. Results from Baumert *et al.* (2005) show clear positive effects of pedagogical content knowledge on students' mathematics achievement.

In two interpretations of pedagogical content knowledge Gess-Newsome and Lederman (1999) make an analytical distinction that seems to have implications for teacher training. In the first interpretation, which they call "the integration model", pedagogical content knowledge is seen as the integrative results of three independent components: subject matter mastery, pedagogical knowledge and knowledge of the teaching context. The implication of this interpretation would be that training for these three components could be done separately, with integration taking place as a creative synthesis by a teaching teacher. According to the second interpretation, which they refer to as "transformational", pedagogical content knowledge is seen as a new kind of knowledge developed on the basis of subject matter mastery, pedagogical knowledge and contextual knowledge. For the first interpretation, course work in each of the components would be the most likely form of training, whereas the second would call for training *in situ*, practice simulations and observation in real-life teaching situations. The two interpretations are depicted in Figure 2.2.

**Figure 2.2. Two interpretations of pedagogical content knowledge**




* = Knowledge needed for classroom teaching.
*Source*: Gess-Newsome and Lederman, 1999, Chapter 1.

## Summary

Teachers matter in terms of the quality of education. Variability in teaching quality, however, is only explained to a limited degree by characteristics such as formal education, personal characteristics and experience. When teacher preparedness is further analytically differentiated by types of knowledge, both subject matter mastery and pedagogical knowledge (particularly in the sense of subject matter didactics) are relevant. Given the kind of field research studies on which this research area depends, effect sizes are often relatively small because of a restriction–of-range phenomenon: in industrialised countries teachers often vary relatively little in terms of these characteristics. More complex "interactive" constructs such as pedagogical content knowledge are very promising for explaining differences in teacher quality, but the number of studies is too limited to draw strong conclusions.

When it comes to forms of training and professional development, a basic distinction can be made between initial training, in-service training courses, and continuous professional development in schools. All of the policy-amenable (i.e. trainable) teacher characteristics discussed in this chapter are likely to be dealt with in initial training and in-service training. Although pedagogical content knowledge might be seen as having a place in continuous professional development, as it would benefit from thinking about teaching and learning in actual practice, it is probably too dependent on expert guidance and support to be realistically left to school staff.

# 2.3 Teacher beliefs and competencies

This section distinguishes two areas: teaching styles and competencies and teacher beliefs (in the sense of preferred teaching paradigms).

## Teaching styles and competencies

In the history of research on teaching the focus on personal characteristics of teachers was followed by an interest in teaching styles and repertoires. When studying teaching styles (Davies, 1972), more attention was focused on the behavioural repertoire of teachers than on deeply rooted aspects of their personality. Within the framework of "research on teaching", there followed a period in which much attention was paid to observing teacher behaviour during lessons. The results of these observations rarely revealed a link with pupil performance (*e.g.* Lortie, 1973). In a following phase, more explicit attention was given to the relation between observed teacher behaviour and pupil achievement. This research is identified in the literature as "process-product studies". Lowyck, quoted by Weeda (1986, p. 68), summarises variables which emerged "strongly" in the various studies:

1. *Clarity:* clear presentation adapted to suit the cognitive level of pupils.
2. *Flexibility:* varying teaching behaviour and teaching aids, organising different activities, etc.
3. *Enthusiasm:* expressed in verbal and non-verbal behaviour of the teacher.
4. *Task-related and/or businesslike behaviour:* directing the pupils to complete tasks, duties, exercises, etc., in a businesslike manner.
5. *Criticism:* much negative criticism has a negative effect on pupil achievement.
6. *Indirect activity:* taking up ideas, accepting pupils' feelings and stimulating self-activity.
7. *Providing the pupils with an opportunity to learn criterion material,* that is, a clear correspondence between what is taught in class and what is tested in examinations and assessments.
8. Making use of *stimulating* comments: directing the thinking of pupils to the question, summarising a discussion, indicating the beginning or end of a lesson, emphasising certain features of the course material.
9. *Varying the level* of cognitive questions and cognitive interaction.

Weeda (1986, p. 69) noted that in the study from which these nine teaching characteristics were drawn, there was much criticism regarding methodology/technique.

During the last five years or so, there has been renewed interest in effective teacher characteristics. In the United Kingdom, Hay McBer (2000, cited by Anderson, 2004) identified twelve characteristics, in the sense of relatively stable traits, associated with effective teachers (Table 2.4) These are closer to learnable competencies than to personality characteristics, although they are clearly linked to them.

Motivational aspects are strongly represented in this list. The issue of teacher motivation is associated with teacher beliefs systems about preferred teaching strategies. These are discussed below.

**Table 2.4. Summary of characteristics associated with more effective teachers**

| Cluster | Characteristic | Description |
|---|---|---|
| Professionalism | Commitment | Commitment to do everything possible for each student and enable all students to be successful |
| | Confidence | Belief in one's ability to be effective and to take on challenges |
| | Trustworthiness | Being consistent and fair; keeping one's word |
| | Respect | Belief that all persons matter and deserve respect |
| Thinking/ reasoning | Analytical thinking | Ability to think logically, break things down, and recognise cause and effect |
| | Conceptual thinking | Ability to see patterns and connections, even when a great deal of detail is present |
| Expectations | Drive for improvement | Relentless energy for setting and meeting challenging targets, for students and the school |
| | Information-seeking | Drive to find out more and get to the heart of things; intellectual curiosity |
| | Initiative | Drive to act now to anticipate and pre-empt events |
| Leadership | Flexibility | Ability and willingness to adapt to the needs of a situation and change tactics |
| | Accountability | Drive and ability to set clear expectations and parameters and hold others accountable for performance |
| | Passion for learning | Drive and ability to support students in their learning and to help them become confident and independent learners |

*Source:* Adapted from Hay McBer (2000) by Anderson (2004), p. 15.

## Teacher beliefs

### Constructivism versus "traditionalism"

During the last three decades two basic teaching and learning paradigms have dominated professional discourse: constructivist-inspired teaching versus more structured (also often qualified as traditional) teaching. The two paradigms are the basis of divergent beliefs about teaching and learning.

Constructivism views reality as being in the mind of the knower, without denying external reality altogether (solipsism), although some radical constructivists come very close to complete denial. The image of student learning that goes with constructivism underlines the active role of the learner. Students are to be confronted with "contextual" real-world environments or "rich" artificial environments simulated by means of interactive media. Learning is self-regulated with lots of opportunity for discovery and students' interpretation of events.

Learning strategies, learning to learn and reflecting on these learning strategies (meta-cognition) are as important as mastering content. Different ways of finding a solution are as important as the solution itself. Terms like "active learning" (Cohen, 1988), "situated cognition" (Resnick, 1987) and "cognitive apprenticeship" (Collins, Brown and Newman, 1989) are used to describe student learning.

The other side of the constructivist coin is teaching and instructional technology that enable students "to construct their own meaningful and conceptually functional representations of the external world" (Duffy and Jonassen, 1992, p. 11). The teacher becomes more of a coach who assists students in "criss-crossing the landscape of contexts", looking at the concept from a different point of view each time the context is revisited (Spiro et al., 1992, p. 8). Cohen (1988) adopts the term "adventurous teaching".

There is less emphasis on structuring goals, learning tasks and plans in advance; goals are supposed to emerge when situated learning takes place and plans are not so much to be submitted to the learner as constructed in response to situational demands and opportunities.

Learning situations must be such that students are invited to engage in sustained exploration of real-life content or simulated environments. Some authors writing from this perspective state that "transfer" is the most distinguishing feature (Tobias, 1991), whereas others mention argument, discussion and debate to arrive at "socially constructed meaning" (Cunningham, 1991).

The role of the assessment and evaluation of students' progress is hotly debated. Radical constructivists take the position that performance on an actual learning task is the only legitimate way to assess, since distinct "external" evaluation procedures cannot do justice to the specific meaning of a particular learning experience for the student.

Others (*e.g.* Jonassen, 1992) conclude that from a constructivist perspective assessment procedures should merely be different: goal-free, rather than fixed on particular objectives, formative rather than summative, and oriented to assessing learning processes rather than mastery of subject matter. Appraisals of samples of products, portfolios and panels of reviewers that examine authentic tasks are also mentioned as acceptable procedures.

Table 2.5 contrasts some of the major distinguishing features of learning and instruction according to the constructivist position with characteristics of more traditional instructional models such as direct instruction and mastery learning.

Bipolar comparisons such as those in Table 2.5 run the risk of over-simplification and polarisation. It should be emphasised that less extreme constructivist views can be reconciled with more "objectivist" approaches (Merrill, 1991). Also, more eclectic approaches are feasible, as when more teacher-controlled and learner-controlled instructional situations are used alternately (Boekaerts and Simons, 1993).

Creemers (1996) considers the changed perspective on the role of the student as the essential difference between the newer, constructivist views on learning and instruction, and the older models: a rather passive student in models originating from the Carroll model and an active student who develops knowledge and skills by working with context, in the newer models.

**Table 2.5. Comparison of traditional and constructivist instructional models**

| Traditional instruction | Instruction inspired by constructivism |
|---|---|
| Emphasis on basic skills | Bias towards higher order skills |
| Prior knowledge as entrance behaviour | Framing role of prior knowledge in a cognitive and motivational sense |
| Subject matter orientation | Emphasis on learning process |
| Structured approach:<br>• pre-specified objectives<br>• small steps<br>• frequent questioning/feedback<br>• reinforcement through high percentage of mastery | Self regulated learning:<br>• "rich" learning environment<br>• intrinsic motivation<br>• challenging problems |
| Abstract-generalisable knowledge | Situation-specific knowledge<br>Learning from cases |
| Standardised achievement tests | Assessment; less circumscribed alternative procedures |

*Source:* Adapted from Scheerens, 1994.

Brophy also describes a way to integrate established principles of structured classroom management and self-regulated learning strategies. Elements of effective classroom management such as "preparation of the classroom as a physical environment suited to the nature of the planned academic activities, development and implementation of a workable set of housekeeping procedures and conduct rules, maintenance of student attention and participation in group lessons and activities, and monitoring of the quality of the students' engagement in assignments and of the progress they are making toward intended outcomes" (Brophy, 1996, pp. 3,4), are equally relevant when instruction is seen as helping students to become more autonomous and self-regulated learners.

When it comes to implementing the new instructional principles, Brophy points to a "guided", gradual approach in which learning goals and expectations are clearly articulated, and students are helped by means of modelling and providing cues. He also stresses that, initially, students may need a great deal of explanation, modelling and cuing of self-regulated learning strategies. As they develop expertise, this "scaffolding" can be reduced.

Ravitz, Becker and Wong (2000) investigated the degree to which American primary and secondary school teachers believed in what they call "the traditional transmission of instruction" perspective or "the constructivist compatible view of instruction". Roughly their findings indicate that adherents of the two paradigms are about evenly distributed, with some subgroups supporting the one more than the other. For example, primary school teachers have constructivist beliefs more frequently than secondary school teachers, and mathematic teachers in secondary schools support the traditional view more frequently than the constructivist view, a pattern that is reversed for English language teachers. These authors also found a fair consistency between constructivist beliefs and patterns of actual teaching practice (measured on the basis of self-reports); correlations between beliefs and stated practice were of the order of .31 to .65.

A study of Dutch secondary schools (Meirink, Meijer and Verloop, 2007) showed, on the one hand, that constructivist teaching behaviour could be shaped by national policy and, on the other, that teachers, after experimenting with it, opted for more traditional teaching centred on the subject matter. Constructivist teaching had been officially propagated as the preferred strategy in upper secondary schools, but this orientation was later severely criticised, after a parliamentary committee reviewed the effects of this reform policy in 2007.

Research on the beliefs about independent and self-regulated learning of 260 Dutch teachers in secondary, vocational and adult education showed that teachers' beliefs are more process-oriented (*i.e.* constructivist) than traditional (oriented towards knowledge transmission) (Bolhuis, 2000; Bolhuis and Voeten, 2004). Based on an observational study in which 130 lessons of 68 teachers in upper secondary education classes of six schools were observed, however, Bolhuis and Voeten (2001) conclude that teaching is best characterised as "activating", that is, located somewhere between traditional and process-oriented. Thus, instruction in these 130 lessons was mostly not classified as traditional (with an accent on knowledge transmission), but there also hardly appeared to be process-oriented instruction reflecting features of independent and self-regulated learning (only 5% of the observed lesson time). Furthermore, no convincing relation was found between teachers' concepts of student learning and their teaching (Bolhuis, 2000).

Van Veen *et al.* (2001) explored the orientations of 452 Dutch secondary school teachers with respect to three aspects of their work: instruction, educational goals and the role of the teacher in the school organisation. Based on the literature, they distinguished six professional orientations to three aspects of teachers' work: a transmission orientation *versus* a self-directed learning orientation (instruction); an orientation towards qualification *versus* an orientation towards personal and moral development (educational goals); and a restricted *versus* an extended orientation (role of the teacher

within the organisation). The results showed that teachers are more learning-oriented than oriented to the transmission of knowledge (instruction). They also consider the qualification of students for their development as more important than their moral development (educational goals). About a third of the teachers had a restricted orientation towards their role in the school organisation.

Furthermore, the findings showed that teachers' subjects were related to their professional orientations: mathematics and science teachers appeared to differ from social studies teachers in being more oriented towards transmission of knowledge than towards moral development. They also considered consultations with their subject colleagues as more important than social studies teachers.

### Teachers' sense of efficacy

Research has indicated that teachers' beliefs about their own level of competence and their sense of self-efficacy affect their practice and students' performance (*e.g.* Ashton and Webb, 1986; Midgley, Feldlaufer and Eccles, 1989; Ross, Hogaboam-Gray and Hannay, 2001). Self-efficacy is a future-oriented belief about the level of competence a person expects he or she will display in a given situation (Bandura, 1997). When teachers have a high sense of self-efficacy they are more creative in their work, intensify their efforts when their performances fall short of their goals and persist longer. Teachers' sense of self-efficacy can thus influence the learning and motivation of students, even if students are unmotivated or considered difficult (Guskey and Passaro, 1994). Although negative correlations between teachers' sense of self-efficacy and students' self-concept of ability and self-reliance have been found (Brookover *et al*., 1979), most studies have found a positive relation between teachers' efficacy beliefs and several student cognitive outcomes, such as achievement in core academic subjects (*e.g.* Anderson, Greene and Loewen, 1988; Ashton and Webb, 1986; Moore and Esselman, 1994) and performance and skills (Midgley, Feldlaufer and Eccles, 1989; Ross, Hogaboam-Gray and Hannay, 2001).

Teachers' perceived self-efficacy not only affects students' motivation directly but also indirectly via the instructional strategies teachers use to create a supportive learning environment (Ashton and Webb, 1986; Dembo and Gibson, 1985). Teachers with a strong sense of efficacy tend to exhibit greater levels of planning and organisation, are more open to new ideas and more willing to experiment with new methods, work longer with students who are struggling, and exhibit greater enthusiasm for teaching (Tschannen-Moran and Woolfolk Hoy, 2001).

Research into the effects of teachers' sense of self-efficacy has indeed shown that it positively influences teacher's practices (Smylie, 1988; Geijsel *et al*., 2009; Wheatley, 2002). Teacher efficacy therefore seems to be a rather strong predictor of how teachers shape their teaching practices in order to encourage student's motivation and performance.

In line with research on the effects of individual teachers' efficacy, scholars have recently started to examine the role of collective efficacy on teachers' practices and student outcomes. Collective teacher efficacy refers to "the perceptions of teachers in a school that the efforts of the faculty as a whole will have a positive effect on students" (Goddard, Hoy and Hoy, 2000, p. 480). Because collective teacher efficacy refers to expectations of the effectiveness of the staff to which one belongs, it differs from individual teacher self-efficacy. Although conceptually different, research has shown that collective and individual sense of efficacy has similar effects on extra efforts for the organisation (Somech and Drach-Zahavy, 2000; Ross and Gray, 2007) and on student achievement (Goddard, 2001; Goddard and Goddard, 2001; Goddard, Hoy and Hoy, 2000; Ross, Hogaboam-Gray and Gray, 2003).

## 2.4 Teaching effectiveness

Whereas teacher effectiveness deals with characteristics of teachers, teaching effectiveness concerns the teaching process. It is beyond the scope of this chapter to review the literature on teaching effectiveness in any depth. However, it is useful to intro-

duce some basic distinctions and overall research evidence because awareness of what helps make effective teaching can provide potential orientations for teacher training and professional development. Teachers' knowledge and skills in areas highlighted in the effective teaching research could be important components of trainable or learnable teaching repertoires.

In theory it would be legitimate to influence teachers' belief systems with respect to "traditional" and constructivist teaching paradigms only if one model gave superior results in terms of student learning and achievement. In reality matters are more complex, first because adherence to a certain teaching paradigm may be based on fashion, preference for "something new" or a persuasive argument, and second because the two paradigms have rarely been set against one another in critical experiments. Instead, research on teaching and instructional effectiveness has looked into teaching factors that are quite mixed in terms of the two paradigms. In fact, factors that can be aligned with one or the other of these paradigms are quite strongly associated with achievement. Thus, the research evidence does not unequivocally favour one over the other.

Teaching is a complex endeavour, involving classroom management, lesson preparation and organisation of teaching and learning activities, creating and maintaining a certain climate, and evaluation and feedback. Broadly speaking there is consensus on what constitutes good teaching.

Brophy (2001) distinguishes 12 principles of effective teaching:

1. *Supportive classroom climate:* students learn best within cohesive and caring learning communities. The role of the teacher as model and socialiser is emphasised.

2. *Opportunity to learn:* students learn more when most of the available time is allocated to curriculum-related activities and the classroom management system emphasises maintaining students' engagement in those activities.

3. *Curricular alignment:* All components of the curriculum are aligned to create a cohesive programme for accomplishing instructional purposes and goals.

4. *Establishing learning orientations:* teachers can prepare students for learning by providing an initial structure to clarify intended outcomes and cue desired learning strategies (*e.g.* providing advance organisers and cuing the kind of responses that are expected).

5. *Coherent content:* to facilitate meaningful learning and retention, content is explained clearly and developed with an emphasis on its structure and connections. When making presentations, providing explanations, or giving demonstrations, effective teachers project enthusiasm for the content and organise and sequence it so as to maximise its clarity and "learner friendliness".

6. *Thoughtful discourse:* questions are planned to engage students in sustained discourse structured around powerful ideas.

7. *Practice and application activities:* students need sufficient opportunities to practice and apply what they are learning and to receive improvement-oriented feedback.

8. *Scaffolding students' task engagement:* the teacher provides whatever assistance students need to enable them to engage in learning activities productively. Structuring and support can be lessened as the students' expertise develops.

9. *Strategy teaching:* the teacher models and instructs students in learning and self-regulation strategies. Meta-cognitive awareness and self-regulation are sought in contexts like problem solving and general learning and study skills. An example is a teacher who thinks out loud while modelling use of the strategy. Students are stimulated to monitor and reflect on their learning.

10. *Co-operative learning:* students often benefit from working in pairs or small groups to build understanding or help one another master skills.

11. *Goal-oriented assessment:* The teacher uses a variety of formal and informal assessment methods to monitor progress towards learning goals. Comprehensive assessment also examines students' reasoning and problem-solving processes.

12. *Achievement expectations:* the teacher establishes and follows through on appropriate expectations for learning outcomes.

It is interesting to note that quite a few of Brophy's principles are variations on the theme of structured teaching (advance organisers, stating clear goals, scaffolding, frequent monitoring and feedback). The next interesting point is the incorporation of some ideas from constructivism: attention to modelling self-regulated learning as well as meta-cognitive processes.

Baumert, Blum and Neubrand (2001) interpret instruction as an opportunity structure for insightful learning. "This means that instructional materials, task selection, and instructional processes are analyzed from the perspective of whether they foster or obstruct active individual knowledge acquisition. … Dimensions of this opportunity structure include the safeguarding of the social action framework by means of appropriate classroom management; pacing and range of learning opportunities (quantity of instruction); general instructional quality, in particular the didactical quality of the structure and realization of the instruction; and the quality of teacher-student and student-student relations."

**Table 2.6. Overview of teaching variables**

| Teacher background characteristics | Classroom ecology and climate | Teaching processes |
|---|---|---|
| Professional knowledge<br>• content knowledge<br>• pedagogical knowledge<br>• insight in student learning<br>• pedagogical content knowledge<br><br>Professional motivation<br>• work satisfaction<br>• locus of control<br><br>Preferred teaching styles<br>• direct teaching<br>• "constructivist" teaching | • class size<br>• classroom composition (average and heterogeneity)<br>• match of teachers and classes<br>• aspects of classroom climate, achievement orientation, discipline, support, ethos<br>• teacher expectations on students' achievement | Pro-active strategies<br>• opportunity to learn<br>• selection and design of adequate learning tasks<br>• technology enriched learning environments<br><br>Interactive strategies<br>• classroom management aimed at optimising active learning time and opportunity to learn<br>• optimising structure and independence in teaching<br>• allowing for manageable adaptivity in teaching<br>• active teaching, diversity in preparation formats<br>• a challenging presentation; cognitive activation;<br>• enacting high expectations<br><br>Retroactive strategies<br>• setting realistic motivating standards<br>• progress monitoring and assessment<br>• adaptive testing<br>• instrumental feedback |

*Source*: Scheerens, 2007.

Scheerens (2007) has provided a schematic overview of variables in teaching (Table 2.6). In a recent meta-analysis, Scheerens (2008) summarised instructional variables according to six broad concepts:

- a curricular dimension, containing opportunity to learn, strategies to learn about the deep structure of domain-specific knowledge, and textbooks;
- a teacher-orchestrated classroom management and climate creation dimension, including time, achievement orientation, high expectations, disciplinary climate, activating measures such as variation in representation formats, media, forms of practice, variation in applications (theoretical and authentic) grouping forms and differentiation/adaptive teaching;
- a teaching strategy dimension with two main sub-categories:
  a) structured, direct teaching, mastery of learning orientation, drill and practice;
  b) constructivist oriented teaching strategy, teaching meta-cognitive strategies, cognitive activation, frequent open learning tasks, discovery learning, fading from more structured to more open assignments;
- a climate dimension, support and positive interactions;
- a dimension representing evaluation and feedback.

The results of the meta-analysis are summarised in Table 2.7.

**Table 2.7. Results of the meta-analysis on teaching factors (6 categories)**

| Category | | Mean eff. | St. error | p | Count |
|---|---|---|---|---|---|
| I | Curricular | .077 | .023 | .001 | 61 |
| II | Teacher-orchestrated classroom management | .095 | .010 | .000 | 304 |
| III | Teaching strategy (structured, direct, mastery, etc.) | .087 | .015 | .000 | 165 |
| IV | Teaching strategy (constructivist-oriented, etc.) | .135 | .008 | .000 | 542 |
| V | Climate, support, positive interactions | .117 | .011 | .000 | 180 |
| VI | Feedback/ monitoring/ assessment/ tests | .065 | .017 | .000 | 152 |

*Source:* Scheerens, 2008.

Instructional variables under constructivist-oriented teaching strategies had the highest mean effect size across studies. Among the individual variables included in this broad category, learning to learn subject-specific learning strategies had the highest effect size (see also Seidel and Shavelson, 2007). Learning subject-specific learning strategies has some resemblance to pedagogical content knowledge, discussed above. It involves two main components: the deep structure of the subject matter taught as well as meta-cognitive strategies, such as self-monitoring the learning process. Earlier reviews and meta-analysis of teaching effectiveness usually found the highest coefficients for elements of structured teaching, such as reinforcement and feedback (*e.g.* Fraser *et al.,* 1987). The interpretation of the current findings, summarised in Table 2.7, combines features of direct instruction and constructivist-oriented teaching. Application would call for broad teaching repertoires in which elements of pre-structuring and scaffolding would be combined with elements of self-regulated learning and guided reflection on learning processes.

## Summary

Teaching effectiveness research underlines the complexity of the teaching act. Constructivist ideas have gradually been incorporated in teaching

models and practices along with more traditional approaches. The analysis of teaching in this research tradition underlines that teaching has many facets. The best lesson for practice would seem to be for teachers to master a broad spectrum of classroom organisational and teaching skills. Therefore, teacher training and professional development of teachers precede the ambitious task of providing teachers with rich teaching repertoires.

## 2.5 Continuous professional development of teachers within schools

Since student outcomes depend greatly on teacher quality, governments, local politicians and school managers need to foster teachers' continuous professional development in order to cope effectively with ongoing changes and improve the quality of education. Strengthening internal school conditions to promote teachers' professional development is considered an important prerequisite for addressing a continuous stream of changes in their environments (*e.g.* demographic changes, large-scale educational innovations, socio-cultural renewal), the multidimensional restructuring demands to which they must respond, and the considerable external pressures arising from the tighter "output" controls introduced by accountability policies. Furthermore, promoting the professional development of teachers is also expected to reduce the alienation that bureaucracy may produce.

Most professional development efforts in the late 1980s and early 1990s were based on a training paradigm which implied a deficit-mastery model and consisted of "one-shot" professional development approaches. Research on these programmes has provided evidence of the failure of earlier concepts of teacher learning as something that is done to teachers (Richardson and Placier, 2001; Clarke and Hollingsworth, 2002). These findings and increased criticism have provided an impetus for many researchers to reconceptualise teachers' professional development by taking a "change as professional growth or learning" perspective to professional development. Inspired by adult learning theories and in line with situated cognitive perspectives on learning (Anderson *et al*., 2000; Clarke and Hollingsworth, 2002; Jarvis, 1987; Kwakman, 2003; Putnam and Borko, 2000; Smylie, 1995), teacher learning is seen as an active and constructive process that is problem-oriented, grounded in social settings and circumstances, and takes place throughout teachers' lives. As a consequence, researchers have emphasised the notion of ongoing and lifelong professional learning embedded in schools as a natural and expected component of teachers' professional activities and a key component of school improvement (Putnam and Borko, 2000; Sleegers, Bolhuis and Geijsel, 2005; Smylie and Hart, 1999).

From this perspective, the focus of teacher learning is on professional activities in schools and on participation in a community of learners (Sfard, 1988; ten Dam and Blom, 2006). This perspective on learning implies that teachers take responsibility for their own actions and acquire the necessary knowledge, skills and repertoire of activities to increase their participation in the school workplace environment. By participating in a variety of professional activities within the school context, teachers stimulate both their own professional development and the development of the school and thus make a significant contribution to improving educational practice. In this sense attention is paid to teachers as members of a (semi) profession in which "teachers acquire new knowledge, skills and values, which will improve the service they provide to clients" (Hoyle and John, 1995, p. 17), and "take the responsibility for this acquiring of new knowledge and skills" (Knoers, 1987). In other words, teachers are supposed to act according to the concept of "reflective practitioners" (Schön, 1983).

In order to improve schools as places for teachers to learn, it is important to acknowledge that not all teachers' learning is conducive to promoting professional development and school improvement. Acknowledging this raises the important questions of which professional activities can improve teachers' participation in school practice and which type of teacher learning needs to be promoted. Based on the available literature and research, the following professional learning activities, which are crucial for enabling teachers to deal with the rapid changes

they face, can be distinguished: keeping up to date (collecting new knowledge and information: Kwakman, 2003; Geijsel *et al*., 2009); experimentation (Kwakman, 2003; Smylie, 1995); reflective practice (giving and asking for feedback: Jarvis, 1987; Smylie, 1995; Van Woerkom, 2004; Runhaar, 2008; Smylie, 1995; Geijsel *et al*., 2009); knowledge sharing (van Woerkom, 2004, Ruhnaar, 2008); and innovation (Janssen and van Yperen, 2004; Runhaar, 2008; Geijsel *et al*., 2009).

During the last decade researchers have paid attention to conditions affecting teacher learning. In most cases, only one theoretical perspective (psychological or organisational) is taken into account. In a first line of research, the role of psychological factors in explaining teachers' learning is examined. This line of research includes studies that attempt to elucidate the influence of teachers' cognition and motivation on teacher learning.

A second line of research comprises studies about organisational learning and professional learning communities, in which organisational conditions, including leadership, are considered the main levers of a school's capacity to change and a prerequisite for linking teachers' professional development to school development (Leithwood and Louis, 1998; Toole and Louis, 2002; Sleegers and Leithwood, in press). These studies often use system theory on change that links structural, cultural and political dimensions of school workplace environments to professional learning.

There is evidence that the two separate lines of research point to important preconditions affecting teacher learning. For the individual, individual capacity to learn and actively (re)construct and apply knowledge is stressed. This seems to be influenced by psychological factors such as career motivation, self-concept, self-efficacy, teacher autonomy and perceived control, and teachers' sense making (Coburn, 2001, 2004; Rosenholtz, 1991; Spillane, Reiser and Reimer, 2002; van Veen, Sleegers and van den Ven, 2005; Runhaar, 2008). The characteristics of the task to be carried out may also play a role in how motivated staff is to learn, *e.g.* the degree of task control and the extent of task variation (Kwakman, 2003).

Among the organisational conditions that influence learning among staff, the role of school leaders is a key factor, especially when it is inspired by the concept of transformational leadership. Research findings on transformational leadership in educational settings identified three core dimensions: vision building, providing individual support and providing intellectual stimulation (Geijsel *et al*., 2003; Leithwood, Jantzi and Steinbach, 1999; Nguni, Sleegers and Denessen, 2006). Among organisational conditions, teacher collaboration aimed at improving instruction and education is also quite relevant (Zwart, 2007). Co-operative and friendly collegial relationships, open communication, and the free exchange of ideas may be sources of emotional and psychological support for teachers' work and promote their professional development (Geijsel *et al*., 2001; Rosenholtz, 1991; Rowan, 1995; Smylie, 1988). The intensity of co-operation and learning among staff, as well as the development of the school as a whole, depend on the degree to which schools create opportunities for teachers' professional learning (Clement and Vandenberghe, 2000; Sleegers, Geijsel and van den Berg, 2002).

Moreover, findings show that task and outcome interdependence may affect group effectiveness and create opportunities for professional development (van der Vegt, Emans and van de Vliert, 1998; Runhaar, 2008). As Wageman (1995) mentioned, task and outcome interdependence may enhance the development of group norms and influence team and individual learning within organisations.

Furthermore, research has shown that teachers' participation in decision making, which supports an "organic" form of school organisation, has positive effects on teachers' motivation and commitment to change (*e.g.* Jongmans *et al*., 2004; Smylie, Lazarus and Brownlee-Conyers, 1996; Geijsel *et al*., 2001, 2009). Moreover, professional learning also depends on the availability of relevant data and agreed standards for interpreting the data. Learning is only possible if school staff are provided with information on important school issues (*e.g.* developments in student performance or the extent of parental participation) (Leithwood, Aitken and Jantzi, 2001; Earl and Katz, 2006).

Although scholars have stressed the need for research that focuses on the interplay of psychological factors, leadership and organisational conditions and uses different perspectives and multi-level models (Richardson and Placier, 2001; Smylie, 1988; Smylie and Hart, 1999), systematic research is scarce. The results of the few available studies show that psychological factors have relatively large effects on teacher learning. The influence of different dimensions of leadership and organisational conditions on professional learning appears to be mediated by these factors (Kwakman, 2003; Smylie, 1988; Smylie, Lazarus and Brownlee-Conyers, 1996; Geijsel *et al.*, 2009).

Recently, researchers have pointed to the importance of freeing the organisation from traditional structures, empowering teachers through collaboration, and developing cultures that value shared responsibilities and values, using the concept of the professional learning community (PLC) (Mitchell and Sackney, 2000; Stoll *et al.*, 2006; Toole and Louis, 2002). The PLC concept is based on two assumptions. First, in line with current situated theories of learning, it is assumed that knowledge and learning are embedded in social contexts and teachers' experience and can be promoted through reflection and social interactions. Second, it is assumed that participation in a PLC leads to changes in teaching practices and subsequently enhances student learning. Although researchers use different key indicators and variables to describe and measure these communities and terms such as professional community (Louis and Kruse, 1995); school-based teacher learning community (McLaughlin and Talbert, 2006); learning community (Mitchell and Sackney, 2000) and school learning community (Sackney *et al*., 2005), they generally conceptualise a professional community as including dimensions such as a focus on student learning, shared values and vision, collective responsibility, reflective professional inquiry, collaboration and group and individual learning (Stoll *et al.*, 2006).

Most of the early work on professional learning communities focused on demonstrating the existence of schools as PLCs by reporting on teachers' perceptions of PLCs' essential characteristics. Only recently have researchers started to examine their impact on changes in teachers' practices and student learning. In their recent review, Vescio, Ross and Adams (2008) found 11 empirical studies that analyse the impact of professional learning communities on teachers' practice and student learning. These studies support the idea that participation in a professional learning community leads to changes in teaching practices as teachers become more student-centred. In addition, the teaching culture improves because a professional learning community increases collaboration, a focus on student learning, teacher authority and continuous teacher learning. The literature also provides some evidence for the claim that student learning increases when teachers participate in professional learning communities (Bolam *et al.*, 2005; Lee and Smith, 1996; Louis and Marks, 1988; Supovitz, 2002). In these studies gains in student achievement scores varied with the focus of teachers and teams, the strength of the PLC (measured as an aggregate index), the extent to which teachers take responsibility collectively for students' academic success or failure, the amount of co-operation among teachers, and the support for professional learning. Furthermore, the data across the studies indicate that a focus on student learning and student needs is a key element of successful professional learning communities. Based on their review, Vescio, Ross and Adams (2008) concluded that the few studies available clearly demonstrated that PLCs have an impact on teachers' practice and student learning. The school contextual variables in the TALIS survey provide some representation of the key characteristics of professional learning communities, specifically school characteristics such as a co-operative climate and evaluation and feedback mechanisms. The survey also distinguishes between individual and collective professional development, the latter matching the philosophy of professional learning communities as a context for continuous professional development.

Although there are indications that schools with these characteristics do indeed promote educational change and enhance student learning, it is necessary to find more rigorous and robust evidence for the claim that continuous professional development in schools can sustain improvement and enhance student learning. Furthermore, the available knowledge base on teacher learning and

conditions fostering teachers' professional development in the workplace is very fragmented: the different studies do not inform each other and rely on different concepts, methods and instruments (Verloop and Kessels, 2006). The fragmented nature of the research on continuous professional development of teachers in schools hinders theory building and the testing of complex multi-level models explaining the impact of teachers' learning on the quality of instruction and student learning. These more complex models are needed to understand the dynamic and recursive links between conditions and effects and how collaboration, participation, leadership, teaming and the like can be an input, throughput, or outcome of learning processes (Imants, Sleegers and Witziers, 2001). Finally, more research is needed to shed light on the nature and process of ongoing teacher learning, school improvement and student learning, using mixed-method and valid and reliable longitudinal data sources (Sleegers and Leitwood, in press; Vescio, Ross and Adams, 2008).

## 2.6 Discussion: implications for the analysis of professional development from the TALIS data set

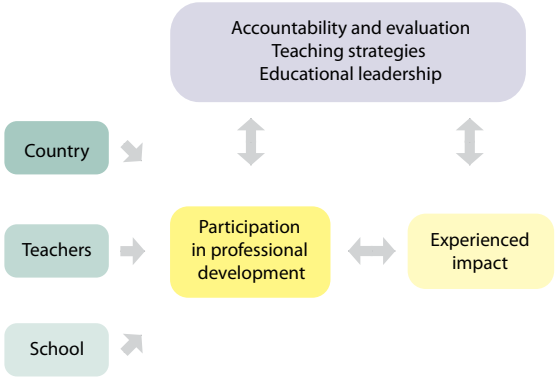
In the TALIS survey the aspects of teachers' professional development addressed in the research literature are fairly well represented:

- central variables are teachers' participation in professional development activities and the experienced impact;
- identification of a broad range of topics that are dealt with in professional development activities, some closer to subject matter mastery and didactics, others closer to skills that are addressed in the human resource development (HRD) approach to continuous teachers' professional development;
- preferred teaching strategies, as they are correlated with preferred substance (experienced needs and barriers) of professional development;
- relevant characteristics of the school context, both objective background characteristics, such as school size, and more "policy-rich" factors, such as those concerned with educational leadership and evaluation and review activities;
- finally, descriptive teacher background characteristics, such as age, gender and experience, which may be associated with their attitudes *vis-à-vis* professional development activities.

Given the state of the art of the knowledge base and the descriptive, cross-sectional nature of TALIS, the conceptual framework is rather simple and its aim is closer to exploration than to explanation.

Basically the model addresses teacher, school and country-level variables which affect participation in teachers' professional development activities and the way in which this is associated with other school policies (school management, evaluation and review, and preferred teacher style) and with the experienced impact of professional development, as indicated in Figure 2.3.

**Figure 2.3. Conceptual model**




This model guides the analysis in the sense that the more descriptive presentations, addressed in Chapter 4 of the report, adhere to simple correlations between pairs of variables, and the more complex associations to be discussed in Chapter 5 are addressed by means of multi-level analyses and covariance structure analysis.

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