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Beliefs about learning and teaching and participation in learning activities by experienced and student teachers in Dutch secondary education

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# Contents

# Chapter 1
# **Introduction**

*In this chapter, first the context, problem, and aim of this thesis are presented. Then, the theoretical background of the study is discussed, and the theoretical model and the main research question are presented. The chapter concludes with an overview of the content of the subsequent chapters.*

## 1.1 Context, problem and aim of the thesis

Teacher learning offers an important way to improve schools, increase teacher quality and improve the quality of student learning. It is therefore an essential and integral part of the teaching profession (Beijaard, Korthagen, & Verloop, 2007; Day, 1999; Feiman-Nemser, 2001; Verloop, 2003). During the past 20 years, teacher learning has increasingly come to be viewed on a continuum: from initial education, to induction, to in-service (Anderson & Olsen, 2006; Feiman-Nemser, 2001) with the first, relatively short stage of the learning continuum often considered as crucial for student teachers' further professional development (Endedijk, Vermunt, Verloop, & Brekelmans, 2012). Important learning activities for the whole continuum of teacher learning include updating knowledge and skills, reflecting on teaching experiences, and collaborating with colleagues (Schraw, 1998; Timperley, Wilson, Barrar, & Fung, 2007; Verloop, 2003).

Not all teachers in the Netherlands, however, are convinced of the importance of teacher learning, and they vary widely in the extent to which they participate in learning activities (Aarts & Waslander, 2008; Diepstraten, Wassink, Stijnen, Martens, & Claessen, 2011; Van Driel, 2006; Vogels, 2009), with consequences for their own teaching quality and the learning outcomes of their students. To determine the causes of this disinterest in teacher learning, substantial research has investigated the factors, both personal and contextual, that influence teacher learning (e.g., Geijsel, Sleegers, Stoel, & Krüger, 2009; Kwakman, 2003; Lohman, 2006; Runhaar, Sanders, & Yang, 2010; Van Eekelen, 2005); however, one important personal factor—namely, teachers' beliefs—has received limited attention to date. Beliefs are important because they are "the best indicators of the decisions individuals make throughout their lives" (Pajares, 1992, p. 307), act as guides to thought and behavior (Borg, 2001) and strongly influence individual working and learning practices (Schommer, 1998). For example, teachers with self-efficacy beliefs, or individual judgments of their own competence to execute a particular task (Bandura, 1986), tend to engage in professional learning activities (Bandura, 1993; Geijsel et al., 2009; Goddard, Hoy, & Woolfolk Hoy, 2000; Runhaar et al., 2010). However, the influence of other types of beliefs on teacher learning remains uncertain. Teachers' beliefs about learning and teaching are closely related to their teaching practices (Calderhead, 1996), though few empirical studies have confirmed the suggested relationship between teachers' beliefs about learning and their own learning (Bolhuis & Voeten, 2004; Opfer & Pedder, 2011; Opfer, Pedder, & Lavicza, 2011; Van Eekelen, Vermunt, & Boshuizen, 2006; Vermunt & Endedijk, 2011). Therefore, this thesis empirically explores the relationship between teachers' beliefs about learning and teaching, classified into student-oriented and subject matter–oriented beliefs, and teachers' participation in learning activities. The aim

of this exploration is to provide additional insights into teachers' attitudes and behavior, with the ultimate goal of identifying clues that will help change teachers' beliefs and enhance their participation in learning activities.

Because the lack of teacher learning initially applies to experienced teachers, this exploration first addresses experienced teachers. Experienced and, more often, older teachers are likely to have more difficulty in changing their professional attitudes and behavior than inexperienced and younger teachers (Hargreaves, 2005). The question thus arises with regard to the first stage of the teacher learning continuum, in which the foundation is laid for career-long learning and teachers are easier to mold: What is the relationship between student teachers' beliefs about learning and teaching and their participation in learning activities in initial teacher education? In addition to the main exploration, this thesis establishes the extent to which student teachers participate in career-long learning activities and whether their participation in learning activities leads to effective teaching behavior. Although several studies have examined student teacher learning (Endedijk et al., 2012; Mansvelder-Longayroux, Beijaard, & Verloop, 2007; Oosterheert & Vermunt, 2001), no studies have specifically addressed student teachers' participation in activities important for career-long learning or examined this relationship between learning and teaching practice for student teachers. Therefore, another goal of this thesis is to explicate student teachers' participation in learning activities in relation to their teaching behaviors.

## 1.2 Theoretical background

Three concepts are central in this thesis: teachers' beliefs about learning and teaching, teacher learning and teaching behavior (in the preliminary study on student teachers). These three concepts stem from three different educational research traditions: teacher effectiveness, teacher thinking and teacher learning. Because they build on one another, the three concepts are discussed in relation to their respective research traditions in chronological order.

### 1.2.1 Effective teaching behavior

Teacher effectiveness research is one of the earliest strands of educational research. In the 1960s and 1970s, this strand was behaviorism-inspired and grounded in a highly influential process-product research program that aimed to identify the processes characterizing teaching that resulted in students performing well on measures of student attainment in reading and mathematics. From these successful teaching processes, behaviors of effective teachers were identified (e.g., Brophy & Good, 1986). Although teacher effectiveness research, in line with advancing insights into learning psychology, from behaviorism, to cognitivism, to

constructivism, provided somewhat different images of the highly effective teacher over time, the idea of teacher effectiveness is still at the heart of contemporary research seeking to identify effective teaching and effective teachers (e.g., Brophy, 1999; Hattie, 2009; Marzano, 2008; Seidel & Shavelson, 2007). Through consistently replicated findings, contemporary teacher effectiveness research has confirmed the importance of teacher behaviors and linked student achievement to a business-like and supportive classroom climate, effective classroom management, the provision of structured and clear information, the quantity and pacing of instruction, student activation by asking questions and small group tasks, the provision of feedback and adaptive teaching (Creemers & Kyriakides, 2012).

Teaching effectiveness is usually evaluated through observation of teacher performances in classrooms. Multiple observation instruments also help assess the quality of teaching behaviors (e.g., Kyriakides, Creemers, & Antoniou, 2009; Stronge, Ward, & Grant, 2007; Van de Grift, 2007). For example, Van de Grift's (2007) observation instrument features six standards and indicators, including 'a safe and stimulating environment', 'efficient lesson organization', 'clear and structured instruction', 'intensifying the lesson and activating students', 'adapting instruction to student differences' and 'teaching students thinking and learning strategies', which are observable in (almost) each lesson. This observation instrument, originally constructed for primary education, is also usable in a secondary education context (Canrinus, 2011). Chapter 6 of this thesis uses Van de Grift's (2007) observation instrument in initial teacher education for secondary schools to explore the levels of student teachers' performance. All six effective teaching behaviors are included as manifest factors of the concept of student teachers' teaching behavior in the theoretical model (Figure 1).

### 1.2.2 Teachers' beliefs about learning and teaching

In the mid-1970s, in line with advances in cognitive psychology, researchers became increasingly interested in teachers' thinking (Fang, 1996). In contrast with the behaviorism-inspired teacher effectiveness approach, which focused on observable teaching behaviors, teacher thinking research tried to get behind the stage to determine the thought processes guiding teachers' performance in the classroom (Conway, Murphy, Rath, & Hall, 2009). Studies of teachers' thinking have also included teachers' theories and beliefs, which constitute an important part of their general knowledge through which they perceive, process and act on information available in the classroom (Clark & Peterson, 1986). Efforts to distinguish between knowledge and beliefs have had difficulty in pinpointing where knowledge ends and beliefs begin (Clandinin & Connelly, 1987). In an analysis of 25 teacher belief studies, Kagan (1992) suggests distinguishing between

facts (knowledge) and opinion (belief). Pajares (1992, p. 325) also argues that "knowledge and beliefs are inextricably intertwined, but the potent affective, evaluative and episodic nature of beliefs makes them a filter through which new phenomena are interpreted". He complains that researchers too often define beliefs according to their own agendas, demanding better agreement about the meaning and conceptualization of beliefs. More than a decade later, no such consensus exists; rather, the concept has acquired rather fuzzy usage, though Borg (2001) cites some common features that still seem to apply: truth elements, the relationship between beliefs and behavior, conscious versus unconscious beliefs, and beliefs as value commitments. Therefore, Borg's definition is used for this thesis: "To sum up, a belief is a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and is therefore imbued with emotive commitment; further, it serves as a guide to thought and behavior" (Borg, 2001, p. 186). Furthermore, beliefs tend to become robust over time and with greater use; the earlier a belief is acquired, the more difficult it is to alter (Murphy & Mason, 2006; Pajares, 1992).

Teachers' beliefs about learning and teaching then are the propositions about learning and teaching that a teacher holds to be true, which in turn guide his or her thoughts and behaviors. Teachers' beliefs are often strong because they have their origin in early childhood and develop during the many years teachers spend at school, first as students, then as student teachers and, finally, as teachers. Research has also found a developmental pattern on teachers' beliefs: At the beginning of their careers, student teachers should think differently than more experienced teachers (Georgiou, 2008; Kagan, 1992; Pajares, 1992; Rimm-Kaufman, Storm, Sawyer, Pianta, & LaParo, 2006), in the sense that student teachers' beliefs are often rather simplistic in nature and lack coherence and structure in the perspectives on teaching (Kagan, 1992; Sugrue, 1997; Tillema, 1995; Zuzowsky, 1995). Murphy, Delli, and Edwards (2004) describe student teachers as being 'sandwiched' (Richardson, 1996) between two important determinants of beliefs—specifically, their past experiences as students and their new experiences in teacher education.

In reference to teachers' beliefs about learning and teaching, educational research often refers to a dichotomy between two orientations to teaching: subject matter–oriented versus student-oriented beliefs (Meirink, Meijer, Verloop, & Bergen, 2009; Van Driel, Bulte, & Verloop, 2007). The same distinction has been described using other terms as well, including content versus student (Denessen, 1999), transmission of knowledge by the teacher versus student learning (De Vries, 2004; Van Veen, Sleegers, Bergen, & Klaassen, 2001), traditional versus process oriented (Bolhuis & Voeten, 2004), traditional versus constructivist (Becker & Riel, 2000;

Tondeur, Hermans, Van Braak, & Valcke, 2008), and reception/direct transmission versus constructivist (OECD, 2009). Regardless of the terminology, this distinction originates from differences in the views of learning and teaching methods. Thus, a subject matter orientation refers to more traditional forms of transmission teaching, with a focus on the transmission and then learning of content and knowledge about a subject matter (Hargreaves, 2000). The teacher is central, as the knowledge expert and deliverer of knowledge; ensures calm and concentration in the classroom; and does not orient him- or herself to the needs of individual students but rather treats the whole class as a collective student. A student orientation, as is widely promoted by most current educational researchers and teacher educators (OECD, 2009), instead is based on constructivist theories of knowledge and learning, focusing on the development of skills and competences, students actively constructing knowledge individually and through social interactions and teachers accounting for differences among students (Pieters & Verschaffel, 2003). Such constructive visions of learning and teaching demand a strong conceptual understanding of the subject matter by teachers. To create powerful learning environments for students of different backgrounds and conceptions, teachers' understanding of subject matter must entail a wide repertoire of both general pedagogical knowledge and pedagogical content knowledge (Borko & Putnam, 1996). The former refers to knowledge of general pedagogical principles, whereas the latter pertains to subject matter knowledge for teaching (Shulman, 1986). In a sense, modern teachers must fulfil both roles: (1) as knowledge expert and competent deliverer of knowledge and (2) as facilitator and activator of students' learning processes (Scheerens, 2010; Verloop, 2003). Contemporary teacher effectiveness research also suggests that teachers should master teaching skills associated with both constructivist models and practices and more traditional approaches (Kyriakides et al., 2009; Lipowsky, Rakoczy, Pauli, Drollinger-Vetter, Klieme, & Reusser, 2009). This thesis also distinguishes between subject matter–oriented and student-oriented beliefs, which teachers could and preferably should combine. Therefore, the two belief orientations are considered two distinct dimensions of teachers' beliefs about learning and teaching. Both experienced teachers' belief orientations (Chapters 3 and 4) and student teachers' belief orientations (Chapter 7) appear as separate concepts in the theoretical model (Figure 1).

### 1.2.3 Teacher learning

Compared with research on teacher effectiveness and teacher thinking, research on teacher learning is relatively new (Bransford, Brown, & Cocking, 2000). In the behavioristic age for example, teacher learning was not a topic in itself. Process-

product-inspired research yielded useful lists of teaching behaviors but did not specify how exactly teachers should teach in this manner. The dominant view held that an autonomous, teaching-oriented professional was one who made all decisions about the curriculum, teaching, learning, assessment, and his or her own professional development. Teachers chose to be 'restricted' or 'extended' professionals (Hoyle, 1980), such that they relied on intuitive and classroom-based thought and practices or accounted for the broader educational context and a wider range of professional activities, respectively. The primary form of professional development available to these teachers was staff development or in-service training, which usually consisted of one-shot workshops or short-term courses (Scheerens, 2010; Villegas-Reimers, 2003).

Since the 1980s, and as a result of changing economic, social and educational developments, teachers gradually began to be expected to continue to learn over the course of their careers (Beijaard et al., 2007; Hargreaves, 2000). It is in this cognitivist age that teachers' knowledge and beliefs were central, under the assumption that teachers who know more (i.e., have a deep and flexible understanding of the knowledge base emanating from disciplines) teach better (Cochran-Smith & Lytle, 1999). Teacher learning in the cognitivist tradition then focused on expansion of knowledge and change of beliefs. However, the courses offered to teachers most often were fragmented, disconnected and irrelevant to the real problems of their classroom practice (Lieberman & Mace, 2010). The cognitivist goals of teacher learning then turned out to be not as easy as thought, with the transfer to teaching practice and improved student outcomes failing to occur (Van Eekelen, 2005).

In the constructivist age of today, teachers are viewed as learning-oriented, adaptive experts, able to teach increasingly diverse sets of learners, knowledgeable about student learning, competent in complex academic content and skillful in the craft of teaching (Vermunt & Verloop, 1999; Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009). Because the knowledge, skills and attitudes needed for this complex teaching profession cannot be developed fully in initial teacher education programs (Feiman-Nemser, 2001; Hammerness et al., 2005), career-long learning is expected of all teaching professionals (Day & Sachs, 2004). Teacher learning today is often described from various viewpoints, each with their own individual conception and definition (Bolam & McMahon, 2004). This is also reflected in current research on teacher learning that draws on various perspectives, such as cognitive psychological (e.g., Borko & Putnam, 1996; Cochran-Smith & Lytle, 1999; Putnam & Borko, 2000), adult/workplace learning approaches (e.g., Eraut, 2000; Lave & Wenger, 1991; Schön, 1983), and several

related fields of study, such as school improvement and organizational development (Kwakman, 2003). Recently, both cognitive psychological and adult/workplace learning approaches have developed from an individualist to a more situative view of learning and share a conception of active, self-directed, constructive and reflective learning, which is situated in physical and social contexts and embedded in both individual and collaborative activities to link new knowledge with existing knowledge. In accordance with this conception of learning and also consistent with other researchers in the field of teacher learning (e.g., Bakkenes, Vermunt, & Wubbels, 2010; Beijaard, 2009; Feiman-Nemser, 2001; Kwakman, 2003; Webster-Wright, 2009), in this thesis, teacher learning is viewed as a career-long, self-directed and active process, during which teachers engage in various formal and informal learning activities, on and off the job, in line with teacher work goals to change their knowledge and beliefs (cognition) and/or their teaching practices (behavior). With regard to the latter part of this definition, in the substantial literature on teacher change there are different views on the change process itself. For example, Guskey (2002) argues that the changes in beliefs will come only after teachers have made changes in their practices and perceived them as successful. Conversely, Desimone (2009) suggests that change in beliefs leads to change in practice, which in turn leads to change in students. Clarke and Hollingsworth (2002) discuss a model of teacher professional growth in which change can begin at any point in the change process. Richardson (1998) also suggests that the order in which beliefs and practices are addressed is not important, but rather what is critical is that both beliefs and practices become the object of reflection. This thesis is consistent with this last view on change and attributes an important role to teachers' engagement in different learning activities to accomplish this.

Regarding these learning activities, this thesis draws on recent research on effective teacher learning, which identifies several characteristics of learning activities associated with improved teacher quality and student learning outcomes. Successful teacher learning then is active and inquiry based (e.g., observing and receiving feedback, analyzing student work), as well as collaborative and collegial (e.g., sharing problems, setting common goals, undertaking instructional planning) (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Desimone, 2009; Timperley et al., 2007; Van Veen, Zwart, Meirink, & Verloop, 2010). These characteristics correspond to important adult learning principles related to practical experiences and interaction and collaboration with others (Bolhuis, 2004, 2009; Eraut, 1994; Gravani, 2012; Merriam, 2008). To these key principles for adult learning, Bolhuis (2004, 2009) and Eraut (1994) add reading publications and studying theory. Therefore, developing and updating knowledge and skills by

reflecting on experiences and collaborating with colleagues are considered important career-long learning activities for the whole spectrum of teacher learning—not just for teachers in the induction and in-service phases but also for student teachers in the initial teacher education stage, which prepares the ground for later learning in subsequent phases (Conway et al., 2009; Hagger, Burn, Mutton, & Brindley, 2008).

Initial teacher education in the Netherlands, as in many other countries, is provided by school-based teacher education programs, increasingly organized as partnerships between colleges/universities and schools, with schools hosting teaching practice with an experienced teacher as mentor of the student teachers (Conway et al., 2009). Student teachers work (and sometimes are paid) as teachers in schools and continue their learning activities both in the schools and in their teacher education institute. Thus, the sources for learning are diverse, including not just theory and literature offered through the institute but also their own experiences during practice teaching at the school and interactions with a mentor, a school-based teacher educator and other colleagues at the practice school (Buitink & Beijaard, 2007; Feiman-Nemser, 2001). The three key career-long learning activities (developing and updating knowledge and skills, reflecting on teaching experiences and collaborating with colleagues) are integral to school-based teacher education, thereby setting a foundation for their career-long learning (Bolhuis, 2004; Buitink & Beijaard, 2007; Conway et al., 2009; Feiman-Nemser, 2001).

To conclude, in this thesis teacher learning is completed with participation in the three learning activities of developing and updating knowledge and skills, reflecting on teaching experiences and collaborating with colleagues. The subsequent studies provide more extensive reviews of the three learning activities. For the investigation of experienced teachers' (Chapters 3 and 5) and student teachers' (Chapters 6 and 7) participation in learning activities, the three learning activities are included as manifest factors of the concept of teacher learning in the theoretical model (Figure 1).

## 1.3 Theoretical model and main research question

The three theoretical concepts of teachers' beliefs about learning and teaching, teacher learning and teaching behavior are brought together in the theoretical model (see Figure 1.) Beliefs about learning and teaching are operationalized as student oriented and subject matter oriented. Teacher learning by both experienced and student teachers is operationalized in participation in the three learning activities of developing or updating knowledge and skills, reflecting on experiences and collaborating with colleagues. Teaching behavior by student

teachers is operationalized in the six effective teaching behaviors of 'safe', 'efficient', 'clear', 'activating', 'adapting', and 'learning strategies'.

Until now, research on teacher beliefs and teacher learning has appeared separately (Opfer & Pedder, 2011), and only a few empirical studies have considered, often indirectly or partly, the relationship between teachers' beliefs about learning and teaching and teacher learning for experienced teachers (e.g., Bolhuis & Voeten, 2004; OECD, 2009; Van Veen et al., 2001, Van Veen & Sleegers, 2006) and for student teachers (e.g., Kubler LaBoskey, 1993; Oosterheert, Vermunt, & Denessen, 2002). Furthermore, systematic research on teacher learning is scarce. Until recently, the study of learning has mainly focused on student learning. Research on teacher learning has focused on student teachers in initial and induction phases, in particular on the design of teacher education and induction programs (Conway et al., 2009; Darling-Hammond, 2006); on aspects of students teachers' learning such as values, preconceptions, ideals and beliefs while following a course at the university (Hagger et al., 2008); on the role of mentors (Giebelhaus & Bowman, 2002); and on the nature of student teacher learning (Endedijk et al., 2012; Mansvelder-Longayroux et al., 2007; Oosterheert & Vermunt, 2001), but little on student teachers' participation in career-long learning activities (Endedijk & Vermunt, 2013). Recently, research has paid some attention to the learning activities of experienced teachers in the workplace (Bakkenes et al. 2010; Kwakman, 2003, Lohman, 2006; Van Eekelen, 2005), but research on experienced teacher learning has mostly focused on the effectiveness of professional development initiatives for teacher learning (e.g., Bransford et al., 2000; Darling-Hammond et al., 2009; Desimone, 2009; Timperley et al., 2007; Van Veen et al., 2010). Yet no research has examined whether the relationship between learning and teaching practice differs for student teachers.

This thesis thus aims to bridge the teacher thinking and teacher learning research traditions and fill the aforementioned gaps in the literature by empirically exploring the relationship between experienced and student teachers' beliefs about learning and teaching and their participation in career-long learning activities as the main research focus and the relationship between student teachers' learning and their effective teaching behavior as a secondary research theme. Therefore, the main question of this thesis is: *What is the relationship between beliefs about learning and teaching and participation in learning activities by experienced teachers and student teachers?*

Regarding the supposed direction of the relationship between teacher beliefs and teacher learning in the theoretical model, this thesis relies on epistemological belief theory in adult learning, which posits that people's beliefs about the nature of

knowledge and learning influence their learning and working (Schommer, 1998). In this theory, both learning and working are interrelated and influenced by the same underlying beliefs related to the nature of knowledge (separate bits and pieces versus highly interrelated concepts) and learning (inherited and unchangeable ability versus ability that improves over time). For teachers, both learning and working (teaching) should also be interrelated and influenced by the same underlying epistemological beliefs, which relate closely to beliefs about learning and teaching (subject matter oriented versus student oriented) in prior studies (Chan & Elliot, 2004; Cheng, Chan, Tang, & Cheng, 2009; Kim, Kim, Lee, Spector, & DeMeester, 2013). For the direction of the relationship between student teachers' learning and their effective teaching behavior, this thesis relies on the connection of teacher learning with improvement of teaching practices found previously for experienced teachers.

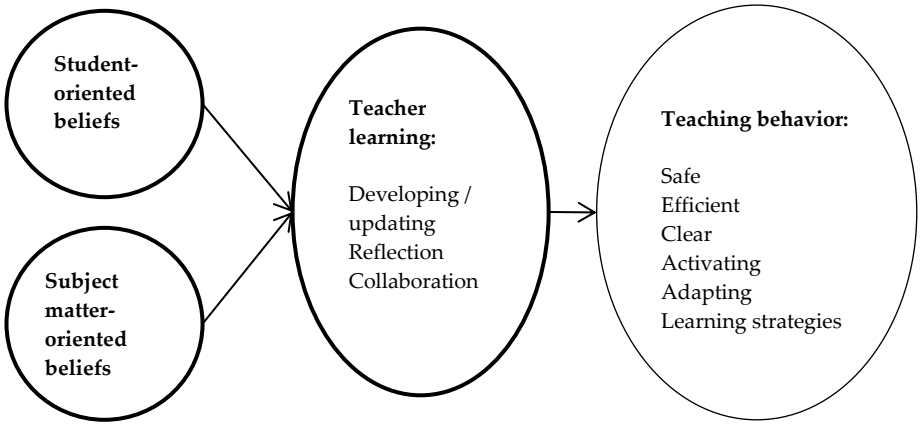



***Fig. 1**. Theoretical model (with the main concepts in bold)*

## 1.4 An overview of the thesis

To answer the main research question, five exploratory studies were performed, described in five separate chapters (3–7). Chapters 3, 4 and 5 are based on one and the same data collection of experienced teachers. In these three chapters, teacher learning by experienced teachers is referred to as participation in Continuing Professional Development (CPD; Day & Sachs, 2004), and consequently learning activities as CPD activities. Chapters 6 and 7 are based on two data collections of student teachers.

Chapter 3 is mainly an introductory character. The first goal of this chapter is to examine whether teacher learning is well represented by participation in the three learning activities. The second aim is to describe experienced teachers' beliefs

about learning and teaching and their participation in the three learning activities. The final aim is to examine the relationship in general between the two types of beliefs and teacher learning.

To understand the meaning of the general relationship for day-to-day practice, Chapters 4 and 5 concentrate more specifically on experienced teachers themselves. Chapter 4 thus specifies experienced teachers' beliefs about learning and teaching. Teachers are likely not exclusively student oriented or subject matter oriented but rather combine both orientations and in different strengths. Therefore, whether and how experienced teachers combine their beliefs about learning and teaching in belief profiles is examined. Then, the relationship between these belief profiles and their participation in learning activities is investigated.

Chapter 5 focuses on experienced teachers' concrete learning behavior. In general, experienced teachers vary in their participation in learning activities. Therefore, this chapter examines whether they can be grouped according to their reported level of participation in learning activities. Then, the characterization of these groups by beliefs about learning and teaching, gender and years of teaching experience is investigated.

Chapters 6 and 7 include studies of student teachers. The study in Chapter 7 builds on the study in Chapter 6, which explores the extent to which student teachers participate in the three learning activities important for career-long learning and whether they can be grouped according to their level of reported participation in learning activities. Then, the relationship between their participation in learning activities and their observed effective teaching behavior is investigated.

Chapter 7 investigates the general relationship between the two belief orientations and student teachers' participation in learning activities, discerns different profiles in student teachers' beliefs about learning and teaching and then relates these to participation in learning activities. The goal of these five chapters is to provide insights into the current status of the Dutch teacher (both experienced and in initial education), qua beliefs and teacher learning.

Chapter 8 presents a summary of the results and the main conclusions of the five studies. The scientific contribution and the implications for educational practice are then discussed, and recommendations for educational policy, teacher education institutes, schools and their administrators, and experienced and student teachers themselves are made. The chapter concludes with reflections on the studies and suggestions for future research.

# Chapter 2
# **Method**

*This chapter provides an outline of the sample of experienced teachers (examined in Chapters 3, 4 and 5), and the two samples of student teachers (investigated in Chapters 6 and 7). In addition, it lists the data collection instruments and presents the data analysis procedures.*

## 2.1 Samples

The study of experienced teachers was conducted among teachers working at four secondary schools affiliated with the School of Education in the northern part of the Netherlands. At the time of data collection (April/May 2010), the total sample featured 1.050 potential participants. Of these, 260 teachers agreed to complete the online beliefs and learning survey (response rate = 25%). The distribution of male and female respondents was 49% and 51%, respectively. Their average age was 46.7 (SD = 10.8; range 21–63 years), and the average years of experience were 18.8 (SD = 11.7). In addition, 30% of the teachers were fully qualified, 48% had a grade-two qualification (i.e., qualification to teach the first classes of secondary education), 9% had a qualification for primary education, and 13% were not (yet) qualified. Table 1 provides a comparison of the gender, age, and qualification distribution of these respondents with the national distribution of teachers in Dutch secondary education. The main difference is in the proportion of fully qualified teachers: 30% in the study versus 41% in the population.

***Table 1***

*Background characteristics of the sample in comparison with the population.*

| | *Sample (in %)* | *Population (in %)* |
|---|---|---|
| male/female[1] | 49/51 | 51/49 |
| average age[1] | 46.7 | 44.5 |
| qualification[2] (fully/grade-two/primary/not qualified) | 30/48/9/13 | 41/45/5/9 |

[1] DUO (2010).
[2] CAOP Research (2008).

The two studies on student teachers are part of a national, longitudinal research project ('Effects of educating teachers at school'), funded by The Netherlands Organization for Scientific Research (project number 411-09-802). All schools in the Netherlands were approached to participate, and student teachers participated voluntarily. For the first study in school year 2011–2012, the total sample (two cohorts) featured 297 secondary student teachers, 67 of whom (response rate = 23%) agreed to complete the learning survey and be observed. The distribution of male and female respondents was 46% and 54%, respectively. Their average age was 26.5 (SD = 7; range 20–56 years).

For the second study on student teachers in school year 2012–2013, the total sample (three cohorts) featured 412 student teachers, 110 of whom (response rate = 26.6%) agreed to complete the online beliefs and learning survey. Of these, 62 were secondary student teachers, 39% of whom were male and 61% of whom were

female. The average age was 24.5 years (SD = 1.9; range 20–29 years). Except for minor differences, the gender and age distributions of the respondents of these two samples resemble the national distribution of student teachers in Dutch secondary education (see table 2).

***Table 2***
*Background characteristics of the two samples in comparison with the population.*

| | *Sample study 1* | *Sample study 2* | *Population*[1] |
|---|---|---|---|
| male/female | 46%/54% | 39%/61% | 44%/56% |
| average age | 26.5 | 24.5 | 24.7 |

[1]DUO (2012).

## 2.2 Data collection instruments

An online questionnaire was developed originally for the experienced teachers, to measure their beliefs about learning and teaching and their participation in learning activities. To verify the validity of the items, experts (i.e., school administrators, expert teachers from the four schools involved) reviewed item formulations, which were in Dutch and as clear and concise as possible. To encourage respondents to represent their beliefs and participation in learning activities accurately and avoid socially desirable answers, the lead-in to items read, "In my teaching it is important…," or were formulated directly and in the first person. Furthermore, respondents' anonymity was guaranteed.

To operationalize experienced teachers' *beliefs about learning and teaching*, 14 items were used, adapted from Denessen (1999) and Vogels (2009). To minimize socially desirable response biases, the items were presented in random order as a single set of items. Respondents indicated the extent to which the item content applied to them on a four-point rating scale (1 = not applicable, 2 = somewhat applicable, 3 = fairly applicable, 4 = fully applicable). Using exploratory factor analysis (see Chapter 3 for a detailed description), two scales were composed: subject matter orientation and student orientation. The two scales showed good reliability (subject matter orientation: Cronbach's $\alpha$ = .84; student orientation: Cronbach's $\alpha$ = .80). The same sets of items were used for the study on beliefs of student teachers. Reliability analyses of the respective sets for student teachers indicated that the two scales were reliable (subject matter orientation: Cronbach's $\alpha$ = .77; student orientation: Cronbach's $\alpha$ = .65).

To measure experienced teachers' *participation in learning activities*, items from a pilot study (Dijkstra, 2009) were adapted and updated, originally based on

qualitative research by Kwakman (1999). The items for updating (11 items), reflective (13 items), and collaborative (16 items) activities appeared as three separate sets, measured using four-point Likert scales (1 = never, 2 = rarely, 3 = regularly, 4 = very often). For the study on experienced teachers, item 9 was removed from the updating scale because of its low item-rest correlation (.16). All three scales showed good reliability (updating: Cronbach's $\alpha$ = .75; reflective: Cronbach's $\alpha$ = .78; collaborative: Cronbach's $\alpha$ = .86). The final scales and items appear in Chapter 3. The same sets of items, including item 9 of the updating scale, were used for student teachers, except that the term 'updating' was replaced with 'developing'. Reliability analyses of the respective sets in the first study of student teachers indicated that all three scales were reliable (developing: Cronbach's $\alpha$ = .77; reflective: Cronbach's $\alpha$ = .75; collaborative: Cronbach's $\alpha$ = .83). Reliability analyses of the three sets for student teachers in the second study also indicated that all three scales were reliable (developing: Cronbach's $\alpha$ = .85; reflective: Cronbach's $\alpha$ = .88; collaborative: Cronbach's $\alpha$ = .88).

To measure student teachers' *effective teaching behavior* (Chapter 6), an observation instrument was used, originally developed for the International Comparative Analysis of Learning and Teaching project (Van de Grift, 2007). Chapter 6 provides a detailed description of this instrument and the observation procedure. The reliability analyses indicated that all scales achieved good reliability (safe: Cronbach's $\alpha$ = .81; efficient: Cronbach's $\alpha$ = .84; clear: Cronbach's $\alpha$ = .87; activating: Cronbach's $\alpha$ = .81; adapting: Cronbach's $\alpha$ = .77; strategies: Cronbach's $\alpha$ = .88).

## 2.3 Data analysis procedures

Three studies employed structural equation modeling as implemented in LISREL 8.8 (Jöreskog & Sörbom, 2007) to investigate the relationships between experienced teachers' beliefs and participation in learning activities (Chapter 3), between student teachers' participation in learning activities and effective teaching behavior (Chapter 6), and between student teachers' beliefs and participation in learning activities (Chapter 7).

The occurrence of different profiles in the respective samples was investigated through cluster analysis techniques that create subgroups (in this case, profiles) of relatively homogeneous cases. Experienced teachers' belief profiles appear in Chapter 4, student teachers' belief profiles appear in Chapter 7, experienced teachers' learning profiles appear in Chapter 5 and student teachers' learning profiles appear in Chapter 6.

Experienced teachers' data exploration using the Kolmogorov–Smirnov test showed that the scores of almost all scales were significantly non-normal. Therefore, for Chapters 4 and 5, non-parametric tests designed for non-normally distributed data were used (Field, 2009). These include the Wilcoxon signed-rank test (comparable to the dependent *t*-test), the Mann–Whitney test (comparable to the independent *t*-test, also used as a *post hoc* test for the Kruskal–Wallis test), the Kruskal–Wallis test (comparable to one-way independent ANOVA) and the Jonckheere–Terpstra test (a specific technique to reveal possible data trends). For Chapters 6 and 7 (the studies on student teachers), the scores were approximately normally distributed, and so parametric tests were used.

# Chapter 3
# Teachers' beliefs and continuing professional development

*The first goal of this chapter is to examine whether teacher learning or continuing professional development (CPD) is well represented by participation in the three learning activities of updating, reflecting and collaborating. The second aim is to describe experienced teachers' beliefs about learning and teaching and their CPD. The final aim is to examine the relationship between the two types of beliefs and CPD.The results indicate that CPD is well represented by participation in the three learning activities. Second, experienced teachers exhibit a generally equal endorsement of student-oriented and subject matter–oriented beliefs and participate significantly more frequently in updating and collaborative activities than in reflective activities. Third, student-oriented beliefs relate positively to teachers' CPD: The more student-oriented teachers are, the more they participate in learning activities. No relationship emerges between subject matter–oriented beliefs and participation in learning activities.*

This chapter is based on:

De Vries, S., Van de Grift, W.J.C.M., & Jansen, E.P.W.A. (2013). Teachers' beliefs and continuing professional development. *Journal of Educational Administration, 51*(2), 213-231.

## 3.1 Introduction

The continuing professional development (CPD) of teachers provides an important tactic for improving schools, increasing teacher quality, and improving student learning (Day, 1999; Hargreaves, 2000; Opfer & Pedder, 2011; Verloop, 2003; Yates, 2007). Important CPD activities include updating knowledge and skills, reflection, and collaboration with colleagues (Schraw, 1998; Timperley, Wilson, Barrar, &Fung, 2007; Verloop, 2003); in particular, reflection appears essential for professional growth (Eraut, 1994; Schön, 1983). Yet despite extensive research into the effective features of CPD (Diepstraten, Wassink, Stijnen, Martens, & Claessen, 2011; Timperley et al., 2007; Van Veen, Zwart, Meirink, & Verloop, 2010), as well as persistent efforts by governments, school administrations, and educators to enhance participation in CPD, teachers vary widely in the extent to which they participate (Aarts & Waslander, 2008; Diepstraten et al., 2011; Van Driel, 2006; Vogels, 2009). And in particular, compared with updating knowledge and skills or collaborating, teachers seem to participate less often in reflective activities (Dijkstra, 2009; Kwakman, 2003; Van Eekelen, 2005).

What can explain such variation? Substantial research highlights several factors, both individual and environmental, that might determine teachers' participation in CPD (e.g., Kwakman, 2003; Runhaar, Sanders, & Yang, 2010). An important but largely neglected factor is teachers' own beliefs, which "are the best indicators of the decisions individuals make throughout their lives" (Pajares, 1992, p. 307). Beliefs are critical guides of thought and behavior (Borg, 2001), as well as filters through which people screen new knowledge and experiences for meaning (Nespor, 1987; Pajares, 1992). Teachers' beliefs about learning and teaching have often been subjects of research; they relate closely to the instructional decisions that teachers make (Calderhead, 1996). We posit in turn that a comparable relationship might exist between teachers' beliefs about learning and teaching and their own learning activities, or CPD.

Epistemological belief theory posits that adults' working and learning are interrelated and influenced by the same underlying beliefs (Schommer, 1998). Some researchers even suggest some congruity between teachers' beliefs about learning and teaching and whether, how, and what teachers learn themselves (Bolhuis & Voeten, 2004; Opfer & Pedder, 2011; Opfer, Pedder, & Lavicza, 2011). Yet research on teachers' participation in CPD and their beliefs thus far has remained separate (Opfer & Pedder, 2011), without sufficient empirical investigation of the link. We undertake such an exploration while also distinguishing teachers' beliefs about learning and teaching as student or subject matter oriented (Van Driel, Bulte, & Verloop, 2007).

## 3.2 Theoretical framework

### 3.2.1 Teachers' beliefs

A belief refers to "a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and is therefore imbued with emotive commitment" (Borg, 2001, p. 186). Teachers' beliefs about learning and teaching thus represent propositions about learning and teaching that teachers hold to be true. Such beliefs develop during the years teachers spend at school—first as students, then as student teachers and teachers (Bolhuis, 2000; De Vries, 2004; Hargreaves, 2000; Kelchtermans, 2008). Over time and with more use, beliefs grow robust, so the earlier a belief is acquired, the more difficult it is to alter (Murphy & Mason, 2006; Pajares, 1992).

Furthermore, teachers' beliefs about learning and teaching generally comprise two orientations: subject matter versus student (Meirink, Meijer, Verloop, & Bergen, 2009; Van Driel et al., 2007). This classification also has been described using other terms, such as content versus student (Denessen, 1999), student learning versus transmission of knowledge by the teacher (De Vries, 2004; Van Veen et al., 2001), traditional versus process-oriented (Bolhuis & Voeten, 2004), traditional versus constructivist (Tondeur, Hermans, Van Braak, & Valcke, 2008), or reception/direct transmission versus constructivist (OECD, 2009). Regardless of the terminology, the distinction refers to different views of learning and teaching methods. A subject matter orientation implies traditional 'transmission teaching', which focuses on the transmission of content about the subject matter (Hargreaves, 2000). In this case, teachers play a central role as knowledge experts and deliverers of knowledge, ensure calm and concentration in the classroom, and do not attend to the needs of the individual students but instead treat the whole class as a kind of collective student. In contrast, a student orientation reflects constructivist theories of knowledge and learning, with focuses on the development of skills and competencies, active and collaborative learning by students, and the specific differences between individual students (Pieters & Verschaffel, 2003). Such constructive views of learning and teaching demand a strong conceptual understanding of the subject matter by teachers, whose wide repertoire of both general pedagogical knowledge and content knowledge enable them to create powerful learning environments for students with different backgrounds and educational levels (Borko & Putnam, 1996). Teachers today often must fill both roles: knowledge expert and competent deliverer of knowledge, as well as facilitator and activator of students' learning processes (European Commission, 2010; Verloop, 2003).

Although student and subject matter orientations often are described as two opposing orientations—the modern versus a more traditional view of learning and teaching (Bolhuis & Voeten, 2004; Boulton-Lewis, Smith, McCrindle, Burnett, & Campbell, 2001; Kember, 1997)—many studies suggest that teachers combine characteristics from both views, with varying frequency distributions (OECD, 2009; Tondeur et al., 2008; Van Driel et al., 2007). That is, teachers may score high or low on both subject matter and student orientations. To study the relationship of these beliefs with teachers' participation in CPD, we therefore consider them distinct but related dimensions of beliefs about learning and teaching.

### 3.2.2 Participation in CPD

In education, CPD is a job-embedded, career-long process, with a learner-focused perspective. Teachers develop actively and voluntarily engage over the course of their career in all sorts of formal and informal activities that reflect the ultimate goals of teachers' work (Day, 1999; Feiman-Nemser, 2001). We classify these activities into three groups: updating knowledge and skills, reflection, and collaboration with colleagues (Schraw, 1998; Timperley et al., 2007; Verloop, 2003). For improving teacher quality and teaching practices, all three groups of activities are effective (Cheetham & Chivers, 2001; Timperley et al., 2007); what appears most essential is participation in diverse CPD activities (Bolhuis, 2009; Schraw, 1998; Timperley et al., 2007) that involve varied lesson-related content, including subject matter, didactics, pedagogics, and pedagogical content knowledge (Van Veen et al., 2010; Wayne, Yoon, Zhu, Cronen, & Garet, 2008).

First, with regard to updating knowledge and skills, teachers develop a practical and theoretical knowledge base in varied content (Verloop, Van Driel, & Meijer, 2001). After their initial education, teachers' practical knowledge expands through experience and teaching practice, but their theoretical knowledge base requires constant and intentional updates to reflect societal and educational developments and innovations. Updating knowledge and skills also is conducive to other professional activities; for example, a sufficient theoretical knowledge base is necessary for meaningful reflection to occur (Van de Ven, 2009; Verloop, 2001). According to Cheetham and Chivers (2001), updating knowledge and skills provides the groundwork for essential specialist knowledge and theory, which also support both reflection and collaboration. We therefore investigate teachers' efforts to read (e.g., professional literature, new textbooks, educational websites) and further their education (e.g., courses, workshops, conferences, training, consultation in or outside school) to update their knowledge and skills after completing their initial schooling.

Second, reflective activities pertain to professional tasks that require a specialized form of thinking to confront a puzzling or curious situation ('problem') and make better sense of it (Dewey, 1933). Schön (1983) calls this form reflection-on-action: a deliberate process developed and purposefully used to reconsider existing knowledge, beliefs, possibilities, ideas, and actions. In contrast, reflection-in-action implies an almost subconscious process that experts develop and refine on the basis of their learning through experience. Reflection is a central professional activity (Eraut, 1994; Schön, 1983) and vital to CPD (Cheetham & Chivers, 2001); in particular, it helps teachers make their tacit knowledge and beliefs explicit, which provides them more control over routine actions in the classroom and, if necessary, over changes to those actions (Schön, 1983). We focus on reflection-on-action, which is possible individually but better with feedback from colleagues or students, and can include practical research, individually and in collaboration with colleagues (Kallenberg, Koster, Onstenk, & Scheepsma, 2007; Ponte, 2002a).

Third, collaborative activities take place within and outside the school. They lead to better teaching and learning outcomes through their supportive, therapeutic benefits, which can reduce stress and improve confidence (Cheetham & Chivers, 2001). Collaboration with colleagues provides teachers with feedback and introduces new ideas and challenges (Kwakman, 2003; Putnam & Borko, 2000). It also helps shape the learning environment and thus directly and indirectly (via classroom-level processes) affects student learning (OECD, 2009). We distinguish two kinds of collaborative activities by teachers (OECD, 2009): exchange activities (e.g., discussing teaching problems, exchanging instructional materials) and professional collaboration (e.g., developing educational materials, team teaching).

Teachers should participate in all three CPD activities, with their different and complementary characteristics. Thus we include all three activities as manifest factors of the latent construct of teachers' participation in CPD in our theoretical model (Figure 1), which also depicts the anticipated relations between the two types of beliefs and CPD.

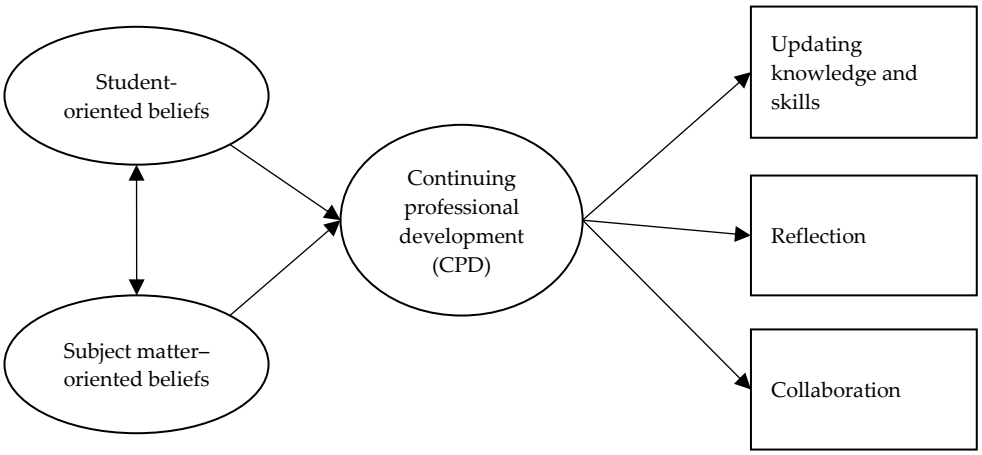



***Fig. 1**. Theoretical model of the links between teachers' beliefs about learning and teaching and their participation in CPD.*

### 3.2.3 Relationship between teachers' beliefs and participation in CPD

Epistemological belief theory in adult learning implies that individual beliefs about the nature of knowledge and learning influences learning and working (Schommer, 1998), which are interrelated and influenced by the same underlying beliefs about the nature of knowledge (separate bits and pieces versus highly interrelated concepts) and learning (inherited and unchangeable ability versus ability that can improve over time). For teachers, both learning (CPD) and working (teaching) should be interrelated too and influenced by the same underlying beliefs.

When Van Veen, Sleegers, Bergen and Klaassen (2001) investigated the relationship between beliefs about learning and teaching and collaboration by 452 secondary school teachers, they found strong relations between subject matter–oriented beliefs and a lack of collaboration, as well as between student-oriented beliefs and substantial collaboration. In a small, qualitative study (six secondary school teachers), Van Veen and Sleegers (2006) also suggested that subject matter–oriented teachers perceive collaboration with colleagues as irrelevant, unlike student-oriented teachers, for whom collaboration is a potential source of support and advice, as well as a means to take joint responsibility for students. Although these two studies pertain to only one CPD activity, they suggest a positive relationship between participation in CPD and student-oriented beliefs but a negative relationship between such participation and subject matter–oriented beliefs. Similarly, the OECD's (2009) large-scale study of 70 000 lower secondary

education teachers in 24 countries reported that teachers' participation in CPD (operationalized as participation in workshops or courses, mentoring, and professional development networks) was weakly positively associated with a student orientation but negatively associated with a subject matter orientation. Finally, in a somewhat related study of 260 higher secondary school teachers, the relationship between teachers' conceptions of student learning (traditional versus process-oriented) and their own learning (also traditional versus process-oriented) appeared congruous (Bolhuis & Voeten, 2004).

These studies offer some insights into possible relationships between beliefs about learning and teaching and teachers' participation in CPD; there may be congruity between teachers' orientation toward student learning and their own level of participation in learning activities. We anticipate that a teacher with a student orientation is more likely to participate in CPD (Hypothesis 1). That is, teachers who are positively oriented toward the learning and development of their students should have positive attitudes toward their own learning and development. In contrast, we expect a negative relationship between subject matter–oriented beliefs and teachers' participation in CPD (Hypothesis 2): Teachers who are positively oriented toward the subject matter and their own role likely have negative attitudes toward their own learning and development. To ensure a fine-grained analysis of the relationships between teachers' beliefs about learning and teaching and their participation in CPD, we specify our four main research questions:

1 How do teachers describe their beliefs about learning and teaching and their participation in the three CPD activities?
2 What is the relationship between teachers' beliefs and teachers' CPD activities?
3 Do the three CPD activities reflect teachers' actual participation in CPD?
4 What is the relationship between the two types of beliefs and teachers' participation in CPD?

We summarize these paths in our theoretical model in Figure 1, which we test using survey methods. Although the hypothesized relationships can have different causal interpretations, with our cross-sectional study, we can describe such relationships accurately.

## 3.3 Methodology

The present research was conducted among teachers working at four secondary schools affiliated with the School of Education in the northern part of the Netherlands. This professional development school for prospective teachers aims to enhance the CPD of in-service teachers as well. The school administrations were motivated to participate in this research, because they hoped to use the results to

bring their staff policy up to date. At the time of the data collection (April/May 2010), after the school administrations sent a recommendation e-mail to survey recipients, we issued another e-mail that explained the study goals and procedures and provided a link to an electronic questionnaire to all 1050 potential participants. We received 260 responses (response rate = 25%), which is approximately average for a web-based survey (Sheehan, 2001) but still seems rather low. The distribution of male and female respondents was 49% and 51%, respectively. Their average age was 46.7 (SD = 10.8), and the average years of experience were 18.8 (SD = 11.7). In addition, 30% of the teachers was fully qualified, 48% had a grade-two qualification (i.e., qualification to teach the first classes of secondary education), 9% had a qualification for primary education, 7% were student teachers, and 6% were not qualified. Thus despite the low response rate, the gender, age, and qualification distribution of these respondents is in accordance with the national distribution of teachers in Dutch secondary education (CAOP Research, 2008), such that the sample appears representative for Dutch education.

### 3.3.1 Instrument

The online questionnaire was developed to measure the constructs in our theoretical model. To verify the validity of the items, experts (i.e., school administrators, expert teachers from the schools involved) reviewed item formulations, which were in Dutch and as clear and concise as possible. To encourage respondents to represent their beliefs and CPD accurately and avoid socially desirable answers, the lead-in to items read, "In my teaching it is important…," or were formulated directly and in the first person. Furthermore, respondents' anonymity was guaranteed.

To operationalize subject matter orientation and student orientation beliefs, we used 14 items adapted from Denessen (1999) and Vogels (2009), presented in random order as one set of items. Respondents indicated the extent to which the item content applied to them on a four-point rating scale (1 = not applicable, 2 = somewhat applicable, 3 = fairly applicable, 4 = fully applicable). Using exploratory factor analysis, we explored the theoretical distinction between the two orientations; with a scree plot and the percentage of variance explained, we derived two factors. The correlation between the factors was sufficiently low ($r$ = .30), which led us to pursue an orthogonal (Varimax) rotated solution. Table 1 shows the loadings of the items on the various factors. We removed two items (13 and 14) that loaded on both factors. The results of this factor analysis indicate a clear theoretical distinction between subject matter–oriented beliefs and student-oriented beliefs in the data: The former refers to instruction with a focus on the transmission and learning of subject matter content/knowledge, with the students

listening. The latter factor pertains to instruction focused on the development of skills and competencies, active and collaborative learning, and accounting for differences among students. The final belief scales, items, and descriptive statistics appear in Table 2**.** A reliability analysis of the two factors resulted in two highly reliable scales (subject matter Cronbach's α = .84; student Cronbach's α = .80).

***Table 1***

*Factor loadings for Varimax-rotated factor analysis of beliefs about learning and teaching.*

| | *Questionnaire Items* | *f1* | *f2* |
|---|---|---|---|
| | In my teaching, it is important that… | | |
| 1. | I pass on my subject matter to the students. | .80 | |
| 2. | the content of my lessons is good. | .60 | |
| 3. | students acquire knowledge. | .83 | |
| 4. | students really listen to what I'm telling them. | .70 | |
| 5. | there is order and discipline during the lesson. | .61 | |
| 6. | students learn the content of my subject matter. | .69 | |
| 7. | students learn how they can best learn my subject matter | .69 | |
| 8. | students learn autonomously to solve problems concerning my subject matter. | | .68 |
| 9. | students, where relevant, learn cooperatively in groups. | | .78 |
| 10. | students develop their skills and competencies. | | .71 |
| 11. | to fit with the pupils' environment. | | .74 |
| 12. | to take into consideration the differences in aptitudes and interests between students. | | .75 |
| 13. | I integrate the latest developments in the field of my subject matter in my lessons. | .53 | .36 |
| 14. | students work actively at my subject matter. | .48 | .34 |

Notes: *f*1 = subject matter orientation, *f*2 = student orientation.

***Table 2***

*Descriptive statistics and scales representing beliefs about learning and teaching.*

| | *Questionnaire Items* | *M* | *SD* | *Item-rest correlation* |
|---|---|---|---|---|
| | In my teaching, it is important that… | | | |
| | **Subject matter–oriented beliefs (α = .84; skewness = -.27; kurtosis = -.97)** | | | |
| 1. | I pass on my subject matter to the students. | 3.27 | .69 | .61 |
| 2. | the content of my lessons is good. | 3.35 | .61 | .70 |
| 3. | students acquire knowledge. | 3.30 | .66 | .54 |
| 4. | students really listen to what I'm telling them. | 3.57 | .52 | .58 |
| 5. | there is order and discipline during the lesson. | 3.41 | .63 | .61 |
| 6. | students learn the content of my subject matter. | 3.48 | .59 | .67 |
| 7. | students learn how they can best learn my subject matter. | 3.64 | .49 | .48 |
| | **Student-oriented beliefs (α = .80; skewness = -.76; kurtosis = .12)** | | | |
| 1. | students learn autonomously to solve problems concerning my subject matter. | 3.51 | .64 | .56 |
| 2. | students, where relevant, learn cooperatively in groups. | 3.26 | .75 | .62 |
| 3. | students develop their skills and competencies. | 3.58 | .61 | .58 |
| 4. | to fit with the pupils' environment. | 3.45 | .62 | .58 |
| 5. | to take into consideration the differences in aptitudes and interests between students. | 3.46 | .62 | .58 |

To measure teachers' participation in CPD, we adapted and updated items from a pilot study (Dijkstra, 2009), originally based on qualitative research by Kwakman (1999). The items for updating (11 items), reflective (13 items), and collaborative (16 items) activities appeared as three separate sets, measured using four-point Likert scales (1 = never, 2 = rarely, 3 = regularly, 4 = very often). Table 3 lists the items and their characteristics. We removed item 9 from the updating scale, because of its low item-rest correlation (.16). All three scales showed good reliability (updating Cronbach's α = .75; reflective Cronbach's α = .78; collaborative Cronbach's α = .86).

***Table 3***

*Descriptive statistics and scales representing the three CPD activities.*

| | *Questionnaire Items* | *M* | *SD* | *Item-rest correlation* |
|---|---|---|---|---|
| | **Updating activities (α = .75; skewness = .24; kurtosis = .79)** | | | |
| 1. | I read newly available material (e.g., through brochures or websites of publishers or visits of exhibitions on teaching materials). | 2.94 | .52 | .55 |
| 2. | I read about educational reforms and promising practices (e.g., newspapers, television, Internet). | 3.03 | .59 | .54 |
| 3. | I read professional journals. | 2.80 | .71 | .44 |
| 4. | I read scientific literature. | 2.45 | .81 | .27 |
| 5. | I study subject matter exercise books and teaching materials, including manuals. | 2.94 | .62 | .31 |
| 6. | I visit digital communities of my subject matter. | 2.56 | .87 | .44 |
| 7. | I read about training opportunities (e.g., leaflets or websites of teacher training institutes). | 2.77 | .62 | .44 |
| 8. | I participate in schooling and training sessions within the school. | 2.91 | .67 | .23 |
| 9. | I participate in one-on-one coaching and mentoring in the classroom. | 1.86 | .86 | .16 |
| 10. | I participate in professional development activities outside the school (e.g., courses, workshops, trainings, summer courses, networks). | 2.59 | .80 | .42 |
| 11. | I visit conferences and meetings of my subject matter or professional association. | 2.22 | .75 | .46 |
| | **Reflective activities (α = .78; skewness = .12; kurtosis = .65)** | | | |
| 1. | After class, I reflect on my lessons. | 3.25 | .57 | .41 |
| 2. | I analyze video recordings of my lessons to improve my teaching practice. | 1.34 | .57 | .43 |
| 3. | I discuss with my students what they experience in my lessons to improve my teaching practice. | 2.49 | .70 | .47 |
| 4. | I visit lessons of colleagues to learn from them. | 1.92 | .69 | .41 |
| 5. | I ask my colleagues to attend some of my lessons to get feedback on my teaching. | 1.79 | .70 | .49 |
| 6. | I discuss events in my teaching with others to learn from them. | 3.04 | .64 | .39 |
| 7. | I participate in peer review meetings at my school to learn from colleagues. | 1.82 | .82 | .42 |
| 8. | I analyze a problem in my practice thoroughly before choosing a solution. | 2.73 | .71 | .44 |
| 9. | I study products from students to understand how my approach has worked | 3.00 | .62 | .46 |
| 10. | I ask students to fill out surveys for feedback on my lessons. | 2.02 | .74 | .36 |

| | *Questionnaire Items* | *M* | *SD* | *Item-rest correlation* |
|---|---|---|---|---|
| 11. | I deal with problems in my teaching by looking at what the literature says about them. | 1.98 | .77 | .42 |
| 12. | I use student performance data to, where needed, adjust my teaching. | 2.84 | .66 | .32 |
| 13. | Once a problem or question arises in my teaching practice, I carry out a small research project into possible causes and solutions. | 2.18 | .79 | .37 |
| | **Collaborative activities (α = .86; skewness = .31; kurtosis = .18)** | | | |
| 1. | I talk about teaching problems with colleagues. | 3.20 | .54 | .38 |
| 2. | I support colleagues in their teaching problems. | 3.11 | .63 | .50 |
| 3. | I share new teaching ideas with colleagues. | 3.18 | .57 | .60 |
| 4. | I share learning experiences with colleagues. | 2.78 | .74 | .52 |
| 5. | I talk about the way I deal with events in my lessons with colleagues. | 3.14 | .52 | .53 |
| 6. | I talk to colleagues about what I think is important in education. | 3.17 | .57 | .51 |
| 7. | I discuss scientific educational theories with colleagues. | 2.06 | .75 | .47 |
| 8. | I discuss improvement and innovation of education at my school with colleagues. | 2.98 | .64 | .52 |
| 9. | I use colleagues' teaching materials in my lessons. | 2.76 | .66 | .37 |
| 10. | I write a new curriculum with colleagues. | 2.20 | .90 | .52 |
| 11. | I construct (digital) teaching material with colleagues. | 2.54 | .93 | .56 |
| 12. | I construct testing and examination materials with colleagues. | 2.63 | .94 | .37 |
| 13. | I study student performance data with colleagues. | 2.48 | .77 | .52 |
| 14. | I prepare lessons with colleagues. | 2.05 | .79 | .61 |
| 15. | I experiment with new teaching methods with colleagues. | 2.36 | .79 | .66 |
| 16. | I give lessons with colleagues (team teaching). | 1.89 | .94 | .34 |

### 3.3.2 Data analysis procedures

To gain insight into how teachers' beliefs about learning and teaching relate to their participation in CPD, we performed several further analyses. First, we computed the mean scores, standard deviations, and paired sample *t*-tests to assess teachers' beliefs and their participation in the three CPD activities. Second, to test the link between beliefs and participation, we conducted correlational analyses. Third, we tested both our third and fourth research questions using structural equation modeling (SEM), implemented in LISREL 8.8 (Jöreskog & Sörbom, 2007). For our study, the measurement model test involves relationships across three separate CPD activities (indicators) and the CPD construct (latent variable). The test of the structural model entails the relationship between the two types of beliefs (exogenous variables) and the CPD construct (endogenous variable). We used

different indices to evaluate the goodness of fit of our model to the data (Hu & Bentler, 1999): the overall $\chi^2$ goodness-of-fit statistic and its associated *p*-value, the root mean square error of approximation (RMSEA; values less than .05 indicate a close fit, and values around .08 indicate an acceptable approximation; Browne & Cudeck, 1993), the goodness-of-fit index (GFI), and the adjusted goodness-of-fit index (AGFI) (both considered good at values above .90).

## 3.4 Results

### 3.4.1 Beliefs about learning and teaching and CPD activities

We standardized all the scale scores for this analysis, and in Table 4 we provide the mean scores and standard deviations for the two belief scales and three CPD scales. Teachers indicate equally strong student-oriented beliefs ($M$ = .86) and subject matter–oriented beliefs ($M$ = .86). That is, on average, teachers endorse both beliefs approximately equally.

In their CPD activities, teachers participate significantly more in updating activities ($M$ = .68) and in collaborative activities ($M$ = .66) than in reflective activities ($M$ = .58; $t$ = 14.06, $p$ < .001, $r$ = .67 and $t$ = 12.84, $p$ < .001, $r$ = .63, respectively). Although the effect is small, they also participate significantly more frequently in updating activities than in collaborative activities ($t$ = 2.17, $p$ < .05, $r$ = .14).

***Table 4***

*Mean scores and standard deviations for two types of beliefs and three CPD activities.*

| *Scale* | *M* | *SD* | *N* |
|---|---|---|---|
| Student-oriented beliefs | .86 | .12 | 258 |
| Subject-matter-oriented beliefs | .86 | .11 | 260 |
| Updating activities | .68 | .10 | 258 |
| Reflective activities | .58 | .09 | 251 |
| Collaborative activities | .66 | .11 | 255 |

### 3.4.2 Interrelations between beliefs and CPD activities

The Pearson correlation coefficients in Table 5 (N = 242, list wise, all *p*s (two-tailed) < .01) indicate a moderate correlation between student-oriented beliefs and subject matter–oriented beliefs ($r$ = .28). That is, high scores on subject matter beliefs are associated with high scores on student beliefs. Teachers thus exhibit characteristics of both views, just distributed differently. The two types of beliefs also may reflect different dimensions of teachers' beliefs about learning and teaching.

Regarding the correlations of the three CPD activities, we find that updating activities correlate significantly with both reflective activities ($r$ = .35) and collaborative activities ($r$ = .34); collaborative activities also correlate with reflective activities ($r$ = .50), which indicates a possible underlying construct of participation in CPD. The student-oriented beliefs correlate moderately with the three CPD activities: updating activities $r$ = .24, reflective activities $r$ = .35, and collaborative activities $r$ = .33. Yet for subject matter–oriented beliefs, we find no significant correlations. These results indicate that it is reasonable to perform the next step, the SEM analysis.

***Table 5***
*Intercorrelations among all model variables.*

| | | *1.* | *2.* | *3.* | *4.* | *5.* |
|---|---|---|---|---|---|---|
| 1 | Student-oriented beliefs | 1 | | | | |
| 2 | Subject matter–oriented beliefs | .28* | 1 | | | |
| 3 | Updating activities | .24* | .11 | 1 | | |
| 4 | Reflective activities | .35* | .06 | .35* | 1 | |
| 5 | Collaborative activities | .33* | .02 | .34* | .50* | 1 |

* Correlation is significant at the .01 level (two-tailed).

### 3.4.3 Testing the theoretical model

To assess the fit of our theoretical model with the empirical data, we first tested the factor structure as a whole (see Figure 1). The starting point of the analysis formed the matrix containing intercorrelations across all model variables (Table 5). One of the three loadings on the latent variable (i.e., teachers' participation in CPD) was set to equal 1.0, to establish a common metric (Long, 1983), and the errors of the two single-indicator constructs (i.e., student- and subject matter–oriented beliefs) were set to 1.0, with the assumption that they were measured without error. The statistical test showed a chi-square value of 2.15, with 4 degrees of freedom, and a $p$-value of .71. The RMSEA of .00, GFI equal to 1.00, and AGFI of .99 indicate the good fit of the model to the data.

Next, we tested the measurement model pertaining to the relationship between the three separate CPD activities (indicators) and the CPD construct (latent variable). The standardized factor loadings (λ), standard errors, and $t$-values of the different indicators of the latent variable (teachers' participation in CPD) were the focus (Table 6). The $t$-values were well above 1.96 (i.e., factor loadings are significant), so we have measured teachers' participation in CPD in a valid way. The standardized factor loadings indicate that reflection, which appears essential for teachers'

participation in CPD, is the most important indicator (.73), followed by collaboration (.69), and then updating knowledge and skills (.48) (*p*s < .001).

***Table 6***

*Standardized factor loadings (λ), standard errors, and t-values of three indicators of the latent variable.*

| | *Standardized factor loadings* | *Standard errors* | *t-Values* |
|---|---|---|---|
| Updating activities | .48 | – | – |
| Reflective activities | .73 | .26 | 5.76 |
| Collaborative activities | .69 | .25 | 5.77 |

The final testing step featured the structural model that contained the relationships between the two types of beliefs (exogenous variables) and the CPD construct (endogenous variable). The two exogenous variables revealed a significant, moderate relationship ($\varphi = .28$, $SE = .07$, $t = 4.21$, $p < .001$). Because these findings are comparable to the Pearson correlation coefficient of student- and subject matter–oriented beliefs ($r = .28$), we confirm that teachers express characteristics of both views, with varying distributions, and that the two types of beliefs can be treated as different dimensions of teachers' beliefs about learning and teaching.

Furthermore, student-oriented beliefs have a moderate to strong, positive relationship with teachers' participation in CPD, with a standardized path coefficient of .50 ($p < .001$). We provide the standardized path coefficients ($\gamma$), standard errors, and *t*-values for both exogenous variables in Table 7. The higher teachers' student-oriented beliefs, the more those teachers participate in CPD, in support of Hypothesis 1. In more general terms, we find that when teachers are positively oriented toward the learning and development of their students, they also are more positively oriented toward their own learning and development. Subject matter–oriented beliefs had no relationship with teachers' participation in CPD though, as indicated by the non-significant negative path coefficient of -.07. In contrast with our prediction in Hypothesis 2, subject matter–oriented beliefs do not affect teachers' participation in CPD. Finally, we recall that with our cross-sectional study, we only describe correlational relationships, not causal relationships. We present the results of the SEM analysis in Figure 2.

***Table 7***
*Standardized path coefficients (γ), standard errors, and t-values of the two exogenous variables.*

| | *Standardized path coefficients* | *Standard errors* | *t-Values* |
|---|---|---|---|
| Student-oriented beliefs | .50 | .05 | 5.0 |
| Subject matter–oriented beliefs | -.07 | .04 | -.89 *(ns)* |

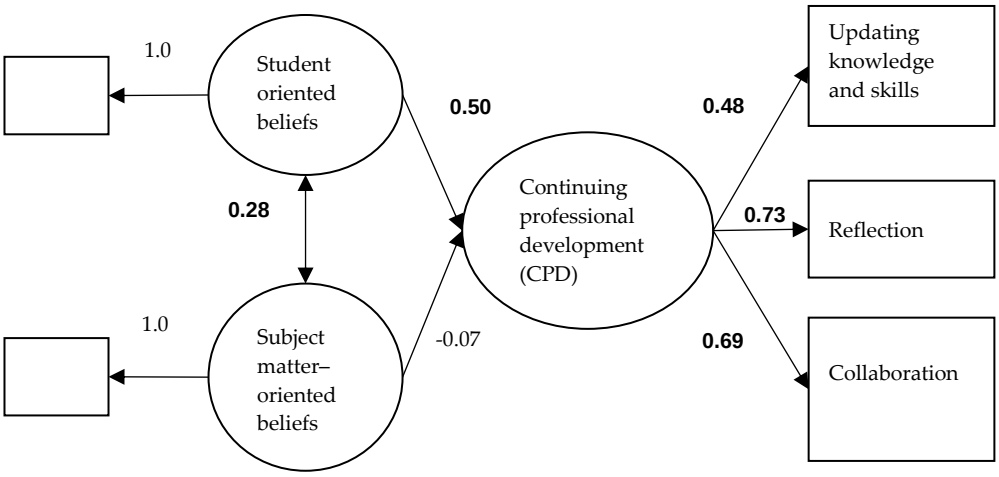



***Fig. 2****. Standardized SEM solution (all bold ps < .001).*

## 3.5 Conclusions and discussion

We have explored the relationship between teachers' beliefs about learning and teaching—classified as student-oriented and subject matter–oriented beliefs—and teachers' participation in CPD in a Dutch secondary education setting. To operationalize CPD, a career-long, job-embedded form of learning, we classified the activities into three groups: updating, reflective, and collaborative activities. We have determined that teachers exhibit a generally equal endorsement of student- and subject matter–oriented beliefs. This result accords with the conventional wisdom that states that today's teachers must fulfill both roles, as both knowledge experts and competent deliverers of knowledge as well as facilitators and activators of students' learning process (European Commission, 2010; Verloop, 2003). Constructive visions of learning and teaching demand a

strong conceptual understanding of the subject matter, together with a wide repertoire of general pedagogical knowledge and pedagogical content knowledge, to create powerful learning environments for students of different backgrounds and with varied means of understanding (Borko & Putnam, 1996). The moderate, but significant, correlation we found between the two belief types ($r$ = .28) suggests that high scores on subject matter beliefs are associated with high scores on student beliefs. Moreover, teachers cannot be assigned to one camp or the other; rather, they embrace elements of both, with different distributions or levels of strength. This finding confirms some previous research (Tondeur et al., 2008; Van Driel & Verloop, 2002; Van Driel et al., 2007).

With regard to participation in the three CPD activities, similar to previous studies, we found that teachers participate significantly less in reflective compared with updating and collaborative activities. As a possible explanation, we note that unlike updating or collaborative activities, reflective activities demand more mental effort (e.g., item 8: "I analyze a problem in practice thoroughly before choosing a solution"; item 11: "I deal with problems in my teaching by looking at what the literature says about them"). In addition, too much reflective effort can lead to rumination (Takano & Tanno, 2009), such that a teacher may decide, consciously or unconsciously, to participate less often in reflective activities than in updating or collaborative activities, as a means of self-protection. Our correlational analysis also showed significant, moderate to strong correlations across the three CPD activities, which indicates a possible underlying construct, as confirmed by the SEM analysis. That is, we measured CPD appropriately, and the three CPD activities reflect CPD well. With regard to relative contributions to CPD, reflection is both essential for teachers' participation and best reflects this participation in CPD. Updating provides the basic groundwork and is conditional for reflection and collaboration; it reflects teachers' participation in CPD moderately; collaborative activities are nearly as good as reflective activities. These results affirm the relative importance of the different CPD activities.

In exploring the relationship between teachers' beliefs about learning and teaching and their participation in CPD, we discovered a significant relationship between student-oriented beliefs and CPD. First, student-oriented beliefs correlated significantly with each of the three CPD activities; for subject matter–oriented beliefs, we found no significant correlations. The role of student-oriented beliefs thus appeared far more important than subject matter–oriented beliefs with respect to CPD participation, a finding confirmed by the SEM results. The positive association between student-oriented beliefs and participation in CPD indicates that the more teachers are student oriented, the more they participate in updating

activities, reflect on their work, and collaborate with their colleagues. Because we found no relationship between subject matter–oriented beliefs and teachers' participation, we assert that these beliefs do not influence, positively or negatively, teachers' participation in CPD, as suggested in previous research (OECD, 2009; Van Veen & Sleegers, 2006; Van Veen et al., 2001).

Thus our exploratory study contributes to the sparse literature related to the relationship between secondary teachers' beliefs about learning and teaching, particularly student-oriented beliefs, and their participation in CPD. In turn, we contribute further to the already vast literature pertaining to teachers' participation in CPD, as well as enhance understanding of the crucial role of beliefs about learning and teaching.

### 3.5.1 Further research

This study has some limitations that suggest directions for research. Our theoretical model ultimately is somewhat limited, which was acceptable for our early, explorative study of teachers' beliefs and participation in CPD activities. Extensions of our model could address the main objective of participation in CPD: teachers who teach better. Even though a student orientation is widely promoted by educational researchers and teacher educators (OECD, 2009), as is participation in CPD, the question of whether a student-oriented, continuously developing teacher is really better (i.e., more effective practices in the classroom, better student learning outcomes) than a less developed teacher who is less student-oriented remains relevant. It would be interesting to explore potential differences in the classroom instructional approaches between teachers who claim to be more student oriented and those who are more subject matter oriented. Furthermore, our study is cross-sectional (all data collected at one point in time); a longitudinal assessment of our proposed model, or an extended version of it, might reveal causal relationships between student orientations and teachers' participation in CPD. In particular, longitudinal studies might reveal if interventions designed to enhance teachers' CPD and student orientation really alter the perspective of more subject matter oriented teachers and lead to sustained change in the classroom (Evans & Kozhevnikova, 2011).

In addition, we note a methodological issue regarding the use of self-reports by teachers to measure their beliefs and participation in CPD. Although individual-specific factors can be effectively assessed by the persons themselves, providing insight into teachers' actions and perceptions, we also acknowledge that beliefs and practices have a complex relationship and are not always congruent (Bolhuis, 2000; Boulton-Lewis et al., 2001; Calderhead, 1996). The use of more data sources, such as classroom observations, interviews, and reflective writings, thus would be

helpful (Borko & Putnam, 1996). For example, an OECD study for the Netherlands (Van Cooten & Van Bergen, 2009) revealed that teachers prefer student-oriented beliefs, but when it comes to teaching practices, they often rely on subject matter–oriented practices. Another methodological issue pertains to the relatively high mean scores on the belief scales. More fine-grained measurement instruments might help reveal nuances in teachers' educational beliefs (Canrinus, 2011). Finally, a third methodological issue arises because we gathered the data from a limited number of schools in just one country (i.e., the Netherlands). Although the sample is representative of the Dutch setting, more research is needed, with larger samples across other countries.

The moderate, significant correlation between the two belief scales ($r$ = .28) implies that teachers embrace characteristics of both views, to varying degrees. Previous research has identified groups of teachers who adopt different belief structures, according to the extent to which they adopt student-oriented versus subject matter–oriented beliefs (e.g., Tondeur et al., 2008; Van Driel & Verloop, 2002; Van Driel et al., 2007). It would be interesting to determine if different belief profiles might emerge from our sample and further discern how they relate to participation in CPD, as well as to individual variables such as gender, years of experience, and qualification level.

### 3.5.2 Practical implications

The relationship between student-oriented beliefs and teachers' participation in CPD is an important finding for enhancing teacher quality and student learning in Dutch education. A student orientation thus should be promoted, both during teacher education and in schools. Yet promoting a student orientation may be challenging, considering the characteristics of beliefs: They can be consciously or unconsciously held (Borg, 2001), developed during the many years teachers spend at school (Bolhuis, 2000; De Vries, 2004; Hargreaves, 2000; Kelchtermans, 2008), and robust and difficult to alter (Murphy & Mason, 2006; Pajares, 1992). So is an adjustment or change in beliefs possible, and if so, how?

Substantial research on 'teacher change' (e.g., Borko & Putnam, 1996; Clarke & Hollingsworth, 2002; Gow & Kember, 1993; Guskey, 2002; Richardson, 1998) offers some indications. Teacher change theories (Clarke & Hollingsworth, 2002; Desimone, 2009; Guskey, 2002) indicate that both beliefs and teaching practices can become the objects of reflection (Richardson, 1998). Teachers need a language for talking and thinking about their own teaching practices, which can enable them to question the sometimes contradictory beliefs that underlie their practices (Freeman, 1991). Both prospective and experienced teachers should be supported and encouraged to make their implicit beliefs explicit, through opportunities to

confront potential flaws in their beliefs. They also should receive new information to examine, elaborate on, and integrate into their existing systems of knowledge (Borko & Putnam, 1996).

Suitable professional development interventions for teachers combine reflection on beliefs and teaching practices with enhancements of student orientations, such as through learning studies (Lo, Pong, & Chik, 2005) and action research projects (De Vries, Beijaard, & Buitink, 2008; Ponte, 2002b). In learning studies, a group of teachers observes live classrooms and collects data on teaching and learning, then collaboratively analyzes it to improve understanding of the specific objects of learning, as well as facilitate learning in authentic situations and in collaboration with others (Lewis, Perry, & Murata, 2006). In action research projects, experienced and student teachers work closely together, developing, applying, and evaluating new educational practices on the basis of teaching and learning issues selected by experienced teachers (De Vries et al., 2008). Other examples of effective interventions include field and classroom experiences (Opfer & Pedder, 2011), collaborative inquiry (Timperley & Earl, 2012), and professional development programs to guide teachers, particularly in reflecting and integrating ideas (Gerard, Varma, Corliss, & Linn, 2011).

The most suitable context for enhancing teachers' student orientation and CPD participation may be a school organized as a learning environment for not just students, but also teachers, with a shared vision of education, focus on learning, and sufficient time and support (Little, 2006; Richardson, 1998; Wayne et al., 2008). Such environments have been supported by Waslander (2007) and Van Veen et al. (2010); Lomos, Hofman, & Bosker (2011) also find small but positive effects on learning outcomes for students.

Finally, school administrators might consider surveying incoming teachers about their beliefs about learning and teaching, to engage them immediately in professional development interventions that can enhance their student orientation. Teachers who want to take a new career step in education, which likely requires them to take subject matter–oriented courses (Vink , Oosterling, Nijman, & Peters, 2010), should be encouraged to broaden their view to include student-oriented approaches too. The need to understand teachers' beliefs about learning and teaching cannot be underestimated, because ultimately, "beliefs may be the critical factors that distinguish between individuals that we would want to be on our workforce and those that we don't want" (Schommer, 1998, p. 134).

# Chapter 4
# **Profiling teachers' beliefs about learning and teaching**

*In the study on the relationship of beliefs with teacher learning, this chapter specifies experienced teachers' beliefs about learning and teaching. Teachers are likely not exclusively student oriented or subject matter oriented but rather combine both orientations and in different strengths. Therefore, whether and how experienced teachers combine their beliefs about learning and teaching in belief profiles is examined. Then, the relationship between these belief profiles and their participation in learning activities is investigated. Three distinctive teacher profiles were identified. The higher the scores on student and subject matter orientation, the higher the teacher's participation in learning activities.*

This chapter is based on:

De Vries, S., Van de Grift, W.J.C.M., & Jansen, E.P.W.A. (2014). How teachers beliefs about learning and teaching relate to their continuing professional development. *Teachers and Teaching: Theory and Practice, 20*(3).

## 4.1 Introduction

The continuing professional development (CPD) of teachers offers an important potential way to improve schools, increase teacher quality and improve the quality of student learning (Day, 1999; Verloop, 2003). For teachers, CPD can update their knowledge and skills while encouraging reflection and collaboration with colleagues (Schraw, 1998; Timperley, Wilson, Barrar, & Fung, 2007; Verloop, 2003). Such reflection appears essential for professional growth (Eraut, 1994; Schön, 1983), though growing awareness also notes the potentially strong role of teacher collaboration in relation to teacher learning (Cordingley, Bell, Rundell, & Evans, 2003; Levine & Marcus, 2010). Teachers differ greatly in the extent to which they engage in CPD activities (Aarts & Waslander, 2008; Diepstraten, Wassink, Stijnen, Martens, & Claessen, 2011; Van Driel, 2006; Vogels, 2009); for example, in the Netherlands, teachers engage far more in CPD activities related to updating and collaboration than in reflection (Dijkstra, 2009; Kwakman, 2003; Van Eekelen, 2005).

Substantial research investigates the factors, both personal and contextual, that influence teacher learning (e.g., Geijsel, Sleegers, Stoel, & Krüger, 2009; Kwakman, 2003; Lohman, 2006; Runhaar, Sanders, & Yang, 2010), though one important personal factor, namely, teachers' beliefs, has received limited attention to date. Such beliefs are important, in that they provide "the best indicators of the decisions individuals make throughout their lives" (Pajares, 1992, p. 307), act as guides to thought and behavior (Borg, 2001) and strongly influence individual working and learning practices (Schommer, 1998). For example, teachers' self-efficacy beliefs—or their individual judgments of their own competence to execute a particular task (Bandura, 1986)—encourage them to engage in professional learning activities (Bandura, 1993; Geijsel et al., 2009; Goddard, Hoy, & Hoy, 2000; Runhaar et al., 2010). However, the influence of other types of beliefs on teacher learning remains uncertain. Teachers' beliefs about learning and teaching appear closely related to their teaching practices (Calderhead, 1996), though few empirical studies confirm the suggested relationship between teachers' beliefs about learning and their own learning (Bolhuis & Voeten, 2004; Opfer & Pedder, 2011; Opfer, Pedder, & Lavicza, 2011; Van Eekelen, Vermunt, & Boshuizen, 2006; Vermunt & Endedijk, 2011).

We therefore empirically explore the relationship between teachers' beliefs about learning and teaching, classified into student-oriented and subject matter–oriented beliefs (Van Driel, Bulte, & Verloop, 2007), and teachers' participation in CPD. Because teachers likely adopt characteristics of both belief dimensions, we first investigate whether teachers can be grouped according to their belief structures. Next, we examine how the identified belief profiles relate to specific CPD activities.

### 4.1.1 Teachers' beliefs about learning and teaching

A belief is "a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and is therefore imbued with emotive commitment" (Borg, 2001, p. 186). Teachers' beliefs about learning and teaching are propositions about learning and teaching that a teacher holds to be true; they develop during the many years teachers spend at school, first as students, then as student teachers and teachers (Bolhuis, 2000; Hargreaves, 2000; Kelchtermans, 2008), and over time and use, these beliefs then become robust (Murphy & Mason, 2006; Pajares, 1992).

A commonly used distinction in educational research refers to a subject matter versus a student orientation of beliefs (Meirink, Meijer, Verloop, & Bergen, 2009; Van Driel et al., 2007). Other terms refer to the same distinction: content versus student (Denessen, 1999), transmission of knowledge by the teacher versus student learning (De Vries, 2004; Van Veen, Sleegers, Bergen, & Klaassen, 2001), traditional versus process-oriented (Bolhuis & Voeten, 2004), traditional versus constructivist (Becker & Riel, 2000; Tondeur, Hermans, Van Braak, & Valcke, 2008) or reception/direct transmission versus constructivist (OECD, 2009). This distinction originates from differences in the views of learning and teaching methods. Thus a subject matter orientation refers to more traditional forms of transmission teaching, with a focus on the transmission and then learning of content and knowledge about a subject matter (Hargreaves, 2000). The teacher is central, as the knowledge expert and deliverer of knowledge; ensures calm and concentration in the classroom; and does not orient him- or herself to the needs of the individual students, but rather treats the whole class as a kind of collective student. A student orientation, as is widely promoted by most current educational researchers and teacher educators (OECD, 2009), instead is based on constructivist theories of knowledge and learning, focusing on the development of skills and competencies, students actively constructing knowledge individually and through social interactions and teachers accounting for differences among students (Pieters & Verschaffel, 2003). Such constructive visions of learning and teaching demand a strong conceptual understanding of the subject matter by the teachers. To create powerful learning environments for students of different backgrounds and conceptions, teachers' understanding of subject matter must be associated with a wide repertoire of general pedagogical knowledge, as well as pedagogical content knowledge (Borko & Putnam, 1996). The former refers to knowledge of general pedagogical principles, whereas the latter pertains to subject matter knowledge for teaching (Shulman, 1986). In a sense, modern teachers must fulfil both roles: as knowledge expert and competent deliverer of knowledge, and as facilitator and activator of students' learning processes (European Commission, 2010; Verloop,

2003). Teaching effectiveness research also suggests that teachers should master teaching skills associated with both constructivist models and practices and more traditional approaches (Kyriakides, Creemers, & Antoniou, 2009; Lipowsky et al., 2009).

Although student- and subject matter–oriented beliefs may appear contradictory in nature or as two ends of the same scale (Becker & Riel, 2000; Boulton-Lewis, Smith, McCrindle, Burnett, & Campbell, 2001; Kember, 1997), several studies demonstrate that teachers actually possess characteristics from both views and that the scales are independent (OECD, 2009; Tondeur et al., 2008; Van Driel et al., 2007). Because teachers might score high on both scales, we consider the two belief orientations as two distinct dimensions of teachers' beliefs about learning and teaching.

Research on teachers' beliefs about learning and teaching also has led to the identification of groups of teachers who adopt different belief structures, depending on the extent to which they adopt student- and subject matter–oriented beliefs. Van Driel and Verloop (2002) identify two groups of science teachers: teacher-directed and student-directed. In another study, Van Driel et al. (2007) note four groups of chemistry teachers: a subject matter–oriented group, a learner-centred group, a group combining the two beliefs and a group with a rather amorphous belief system. Tondeur et al. (2008), in a primary education setting, also find four profiles: a combined constructivist and traditional profile, a constructivist profile, a traditional profile and an undefined profile. Vogels (2009) used a survey of 2715 secondary school teachers to identify three groups: Roughly half of the teachers were both subject matter– and student-oriented, and the other half showed a dominance of one particular type. The OECD (2009), in an international study, reveals differences in the pattern and strength of endorsement of the two views across countries. Because these previous results are not univocal, we seek belief profiles in our sample, as a relevant exploration.

### 4.1.2 Teachers' continuing professional development (CPD)

As a career-long process, CPD has a learner-focused perspective, such that teachers actively develop and engage over the course of their careers, voluntarily and in all sorts of formal and informal activities, both on and off the job, whose purpose and direction derive from the goals of the teachers' work (Day, 1999; Eraut, 1994; Feiman-Nemser, 2001; Knight, 2002). These activities can be classified in three groups: updating knowledge and skills, reflection and collaboration with colleagues (Schraw, 1998; Timperley et al., 2007; Verloop, 2003). Regarding the effectiveness of CPD activities to improve teacher quality and teaching practice, research indicates that all three groups of activities are effective (Cheetham & Chivers, 2001; Timperley et al., 2007). What seems essential is their participation in

diverse CPD activities (Bolhuis, 2009; Schraw, 1998; Timperley et al., 2007), with a focus on lesson-related content such as subject matter, general pedagogical knowledge and pedagogical content knowledge (Van Veen, Zwart, Meirink, & Verloop, 2010).

Pertaining to updating activities in particular, during teacher education, teachers develop a practical and a theoretical knowledge base (Knight, 2002; Verloop, Van Driel, & Meijer, 2001) in these three main fields. After initial teacher education, practical knowledge, which often remains implicit (Zanting, Verloop, & Vermunt, 2001), expands through experience during teaching practice, but the theoretical knowledge base requires constant, intentional updates to respond to continuing societal and educational developments and innovations. Furthermore, updating activities are conducive for other professional activities, especially reflection, because a sufficient theoretical knowledge base is a necessary prerequisite of meaningful reflection (Van de Ven, 2009; Verloop, 2001). According to Cheetham and Chivers (2001), updating activities are a basic foundation for essential specialist knowledge and theory for reflection and collaboration. In this study, we refer to updating activities such as reading (e.g., professional literature, newly published textbooks, educational sites on the Internet) and schooling (e.g., courses, workshops, conferences, training, consultation in or outside the school) designed to update knowledge and skills after the teacher's initial education.

Reflective activities pertain to professional activities in which reflection is central. This specialised form of thinking can be applied to a puzzling or curious situation (i.e., a 'problem') to make better sense of that situation (Dewey, 1933). Schön (1983) calls this form of reflection 'reflection-on-action': a deliberate process developed and purposely used to reconsider existing knowledge, beliefs, possibilities, ideas and actions. In contrast, 'reflection-in-action' is an almost subconscious process that experts develop and refine as a consequence of their learning through experience. Reflection is a major professional activity (Eraut, 1994; Schön, 1983) and vitally important to CPD (Cheetham & Chivers, 2001), because it helps teachers explicate their implicit or tacit knowledge and beliefs, granting them more control over their routine actions in the classroom and, if necessary, the ability to make changes (Schön, 1983). In this study, we focus on reflection-on-action, which a teacher can perform individually or with feedback from colleagues or students, as well as in the form of practical research conducted individually or in collaboration with colleagues (Kallenberg, Koster, Onstenk, & Scheepsma, 2007; Ponte, 2002a).

Finally, collaborative activities refer to collaboration with colleagues within and outside the school. The contribution of collaborative activities to better teaching

and better learning outcomes is important; they have both supportive and therapeutic benefits, which can reduce stress and help improve confidence (Cheetham & Chivers, 2001; Cordingley et al., 2003). They also provide teachers with feedback and bring about new ideas and challenges (Cordingley et al., 2003; Kwakman, 2003; Putnam & Borko, 2000), and they can contribute to shape the learning environment and thus directly and indirectly (via classroom-level processes) affect student learning (Cordingley et al., 2003; OECD, 2009). For this study, we distinguish two kinds of collaborative activities by teachers (OECD, 2009): exchange activities (e.g., discussing teaching problems, exchanging instructional materials) and professional collaboration (e.g., developing educational materials, team teaching).

Teachers should participate in all three activities, which have different characteristics and complement one another. In the next section, we offer a deeper explication of the possible relationships between teachers' beliefs about learning and teaching and their participation in CPD.

### 4.1.3 Relationship of teachers' beliefs about learning and teaching to their participation in CPD

According to epistemological belief theory in adult learning, people's beliefs about the nature of knowledge and learning may influence their learning and working (Schommer, 1998). In this theory, both learning and working are interrelated and influenced by the same underlying beliefs related to the nature of knowledge (separate bits and pieces versus highly interrelated concepts) and learning (inherited and unchangeable ability versus ability that can improve over time). For teachers, both learning (CPD) and working (teaching) should be interrelated too and influenced by the same underlying epistemological beliefs, which relate closely to beliefs about learning and teaching (subject matter oriented versus student oriented) in prior studies (Chan & Elliot, 2004; Cheng, Chan, Tang, & Cheng, 2009). With respect to the nature of the relationships between teachers' beliefs about learning and teaching and teachers' participation in CPD some empirical studies offer further indications.

Kubler LaBoskey (1993) investigates student teachers' beliefs about learning and teaching in relation to their inquiry orientation (reflection). She finds relationships between seeing the teacher as a transmitter (subject matter orientation) and a lack of motivation to engage in reflection, as well as between seeing the teacher as a facilitator (student orientation) and an internal motivation to engage in reflection. Becker and Riel (2000) study teachers' traditional versus constructivist beliefs in relation to professional engagement, or collaboration in the broadest sense, and find, among 4083 primary and secondary teachers, that the more professionally

engaged these teachers were, the more likely they were to have constructivist beliefs, whereas less professionally engaged teachers were more likely to have traditional beliefs. Van Veen et al. (2001) investigate, among other things, the relationship between beliefs about learning and teaching and the extent of collaboration by 452 secondary school teachers. Strong relations arose between subject matter–oriented beliefs and little or no collaboration, and then between student-oriented beliefs and much collaboration. On the basis of their small qualitative study (six secondary school teachers), Van Veen and Sleegers (2006) suggest that student-oriented teachers perceive collaboration with colleagues as relevant, whereas subject matter–oriented teachers perceive it as having little relevance. Although these four studies pertain to two separate CPD activities (i.e., reflection and collaboration), they suggest a positive relationship between student-oriented beliefs and participation in CPD but a negative relationship between subject matter–oriented beliefs and participation in CPD. This relationship is confirmed by the OECD (2009), through a large-scale study of 70 000 teachers of lower secondary education in 24 countries. Although with weak correlations, student orientation appears positively associated with teachers' participation in CPD (e.g., participation in workshops or courses, mentoring, networks for professional development), whereas a subject matter orientation was negatively related to participation in CPD across countries.

These studies offer some insight into the possible relationships between the two types of beliefs about learning and teaching and teachers' participation in CPD: Symmetry could exist between teachers' orientation toward student learning (i.e., student-oriented beliefs versus subject matter–oriented beliefs) and teachers' own learning activities (i.e., more versus less participation in CPD). However, there is a paucity of research investigating these actual relationships between teachers' belief profiles and their participation in CPD, which makes this exploration relevant. In the present study, we pursue the following research questions:

1 How do teachers report their beliefs about learning and teaching and their participation in the three CPD activities?
2 Is it possible to discern different patterns (profiles) in teachers' beliefs about learning and teaching?
3 What is the relation between these belief profiles and teachers' participation in CPD?

## 4.2 Method

### 4.2.1 Participants and context

We conducted this research among teachers working at four secondary schools in the northern part of the Netherlands, affiliated with the School of Education, a professional development school for prospective teachers that aims to enhance participation in CPD by in-service teachers as well. In the Netherlands, teachers are entitled (by collective labour agreement) to spend 10 per cent of their working hours on CPD and also are expected, throughout their careers, to take responsibility for their own participation in CPD, such that it is not compulsory. At the time of the data collection (April/May 2010), after the schools' management sent a recommendation e-mail, we forwarded an e-mail that described the study goals and procedure and a link to an electronic questionnaire to 1050 teachers. The questionnaire was completed by 260 respondents (average response rate of 25%). The distribution of male and female respondents was 49% and 51%, respectively. Their average age was 46.7 years (SD = 10.8), ranging from 21 to 63 years. The average amount of experience was 18.8 years (SD = 11.7), ranging from 1 to 42 years of teaching experience. Furthermore, 26% had a university qualification (equivalent to a Master's), whereas 70% earned a High Professional Education qualification (Bachelor's), and 4% had a lower qualification. Despite the rather low response rate, the gender, age and qualification distributions of respondents were in accordance with the national distribution of teachers in Dutch secondary education (CAOP Research, 2008). This correspondence suggests that the sample is representative of the Dutch situation.

### 4.2.2 Measure

An online questionnaire was developed to measure the five constructs: student orientation, subject matter orientation, updating, reflection and collaboration. To verify the validity of the items, experts (i.e., school managers and expert teachers from the schools involved) reviewed and reworded some item formulations. Items were formulated in Dutch, as clearly and concisely as possible. To encourage respondents to represent their beliefs and behavior as realistically as possible as and avoid socially desirable answers (the so-called leniency effect), the items were introduced by the stem 'In my teaching it is important …', or else were formulated as directly as possible and in the first person. Anonymity was guaranteed.

To operationalise subject matter orientation and student orientation, we used 14 items adapted from Denessen (1999) and Vogels (2009). To minimize socially desirable response biases, we presented the items in random order as a single set of items. Respondents indicated the extent to which the item content applied to them

on a four-point rating scale (1 = 'not applicable', 2 = 'somewhat applicable', 3 = 'fairly applicable', 4 = 'fully applicable'). Exploratory factor analysis indicated two factors in the data that require denomination: subject matter–oriented beliefs and student-oriented beliefs. Table 1 in Chapter 3 (p. 29) shows the loadings of the items; we removed two items (13 and 14) that loaded on both factors. Factor 1 refers to instruction with a focus on the transmission and learning of subject matter content, while students listen (e.g., 'In my teaching it is important that there is order and discipline during the lesson.'). Factor 2 pertains to instruction focused on the development of skills and competencies, active and collaborative learning and accounting for differences among students (e.g., 'In my teaching it is important that students develop their skills and competencies.'). The final belief scales, items, and descriptive statistics appear in Table 2 in Chapter 3 (p. 30). A reliability analysis of the two factors resulted in highly reliable scales (subject matter Cronbach's $\alpha$ = .84; student Cronbach's $\alpha$ = .80).

To measure teachers' participation in CPD, we originally based the items on qualitative research by Kwakman (1999, 2003), then adapted them according to a pilot study (Dijkstra, 2009). The items for the updating, reflective and collaborative activities appeared as three separate sets. The items reflect the CPD activities that teachers theoretically should undertake; the respondents indicated the extent to which they participated in the CPD activities on a four-point rating scale (1 = 'never', 2 = 'rarely', 3 = 'regularly', 4 = 'very often'). For updating, we used 10 items referring to reading (e.g., professional literature, newly published textbooks, educational websites) and schooling (e.g., courses, workshops, conferences, training, consultation in or outside school). Reflecting, in the sense of reflection-on-action, was measured by 13 items representing different sources of feedback (individual reflection, feedback from colleagues or students) and using different tools (e.g., students' grades, practical research). Collaborating was measured by 16 items referring to two kinds of collaborative activities by teachers: exchange activities (e.g., discussing teaching problems, exchanging instructional materials) and professional collaboration (e.g., developing educational materials, team teaching). Items combining different CPD activities (e.g., reflection and collaboration in 'I ask my colleagues to attend some of my lessons to get feedback on my teaching') entered what we deemed to be the most prominent CPD category (i.e., reflection). Table 3 in Chapter 3 (p. 31) reveals the items and their characteristics for the three scales. All three scales showed good reliability (updating Cronbach's $\alpha$ = .75; reflective Cronbach's $\alpha$ = .78; collaborative Cronbach's $\alpha$ = .86).

### 4.2.3 Data analysis procedures

To gain insight into how teachers' beliefs relate to their CPD activities, we analysed the preceding five scales. Further exploration of the data showed that the scores for four of the scales (student-oriented beliefs $D(242) = .15$, subject matter–oriented beliefs, $D(242) = .14$, updating, $D(242) = .10$, collaboration $D(242) = .08$; but not reflection $D(242) = .06$, *ns*) were significantly ($p < .05$) non-normal. Therefore, we decided to use non-parametric tests (Field, 2009).

For the first research question, related to teachers' beliefs and participation in the three CPD activities, we computed mean scores and standard deviations. Using Wilcoxon signed-rank tests, we then compared teachers' participation in the three CPD activities. The second research question, pertaining to the occurrence of different belief profiles, followed a cluster analysis technique, in which we created subgroups (i.e., profiles) of relatively homogeneous cases, using the scores on the two beliefs scales. A Kruskal-Wallis test assessed the differences between the two belief orientations for each belief profile; Mann-Whitney tests indicated specifically where the differences existed; and Jonckheere's tests revealed possible trends in the data. For the third research question, regarding the relation between the belief profiles and the three CPD activities, we conducted the same tests: the Kruskal-Wallis test to assess differences across the three CPD activities that determined the belief profiles, the Mann-Whitney tests to determine where the differences exist, and Jonckheere's tests to reveal possible trends in the data.

## 4.3 Results

### 4.3.1 Teachers' beliefs about learning and teaching and participation in CPD

For the analysis, we standardised all the scale scores. Table 4 shows the mean scores and standard deviations for the two belief scales and three CPD scales. According to the comparison of teachers' beliefs about learning and teaching, they appear to hold equally strong student-oriented ($M = .86$) and subject matter–oriented ($M = .86$) beliefs. For the comparison of teachers' participation in CPD activities, the Wilcoxon signed-rank tests showed that teachers on average participated significantly more frequently in updating activities ($M = .68$) than in reflective activities ($M = .58$), $T = 3108$, $p < .001$, $r = -.69$, and also significantly more frequently in collaborative activities ($M = .66$) than in reflective activities ($M = .58$), $T = 3601$, $p < .001$, $r = -.66$. Although the effect was small ($r = -.15$), teachers on average also participated significantly more frequently in updating activities ($M = .68$), than in collaborative activities ($M = .66$), $T = 12479$, $p < .05$. The standard deviations of the two belief dimensions (student-oriented SD = .12, subject matter–

oriented SD = .11) showed that teachers varied in their beliefs, so it seemed reasonable to explore their beliefs about learning and teaching in more detail through a cluster analysis.

***Table 4***

*Mean scores and standard deviations for teachers' beliefs and teachers' CPD activities.*

| | *M* | *SD* | *N* |
|---|---|---|---|
| Student-oriented beliefs | .86 | .12 | 258 |
| Subject matter–oriented beliefs | .86 | .11 | 260 |
| Updating activities | .68 | .10 | 258 |
| Reflective activities | .58 | .09 | 251 |
| Collaborative activities | .66 | .11 | 255 |

### 4.3.2 Belief profiles

We ran the cluster analysis on the scores of the two belief scales for all 258 cases. A hierarchical cluster analysis using Ward's method served to provide some sense of the possible number of clusters, and three clusters emerged from the dendogram. The clustering was rerun with the *k*-means method, which iteratively estimated the cluster means and assigned each case to the cluster for which its distance from the cluster mean was the smallest. Thus, three profiles were created, each of relatively homogeneous cases. Table 5 presents the scores (means and medians) of the belief scales of each cluster. However, all teachers also exhibited characteristics of both views. Half of the teachers (49%) reflected dominance by one particular type (i.e., subject matter–oriented beliefs in cluster 1, student-oriented beliefs in cluster 2), whereas the other half (51%) showed an equal endorsement of both types of beliefs (cluster 3). The Kruskal-Wallis test showed that the two belief orientations differed significantly ($p < .01$) across the clusters: student-oriented beliefs $H(2) = 166.35$ and subject-matter-oriented beliefs $H(2) = 150.10$. Mann-Whitney tests ($p < .01$), used to follow up on these findings (see Table 6), revealed that all three clusters differed significantly from one another on the student-oriented belief scale. For the subject matter–oriented belief scale, the differences between clusters 1 and 2 and between clusters 2 and 3 were significant; the differences between clusters 1 and 3 were not.

***Table 5***
*Means and medians for the two types of beliefs per cluster (N = 258).*

| | *Cluster 1 (n = 52)* | | *Cluster 2 (n = 76)* | | *Cluster 3 (n = 130)* | |
|---|---|---|---|---|---|---|
| | M | Mdn | M | Mdn | M | Mdn |
| Student-oriented beliefs | .71 | .75 | .81 | .80 | .95 | .95 |
| Subject matter–oriented beliefs | .90 | .89 | .73 | .75 | .92 | .93 |

***Table 6***
*Results of the Mann-Whitney tests comparing the belief orientations between clusters.*

| | *Student-oriented beliefs* | | | *Subject matter–oriented beliefs* | | |
|---|---|---|---|---|---|---|
| | U | z | r | U | z | r |
| Cluster 1 – Cluster 2 | 949 | -5.07 | -.45 | 81 | -9.26 | -.81 |
| Cluster 2 – Cluster 3 | 964 | -9.83 | -.69 | 216 | -11.52 | -.80 |
| Cluster 1 – Cluster 3 | 0 | -10.76 | -.79 | 2868 | -1.62 ns | -.12 |

The scores for the clusters in Table 5 allow us to typify three types of teachers with differing beliefs about learning and teaching, referring to their relative positions on the three scales. The first cluster (Cluster 1 = 20%) was characterised by a relatively low student orientation and a relatively high subject matter orientation. Teachers in this cluster therefore can be defined as predominantly subject matter oriented (SMO profile). The second cluster (Cluster 2 = 29%) earned an average score on student orientation and a relatively low score on subject matter orientation, so we refer to the teachers in this cluster as predominantly student oriented (STO profile). Finally, the dominant third cluster (Cluster 3 = 51%) was characterised by relatively high student orientation and subject matter orientation scores. Therefore, we label it the combined student-oriented and subject matter–oriented profile (or STOSMO profile).

Jonckheere's tests revealed significant trends in the data: From the SMO, continuing to the STO and concluding with the STOSMO profile, the medians (Table 5) of the separate beliefs increased, for both student-oriented beliefs, $J$ = 18678, $z$ = 13.39, $r$ = .83, and subject matter–oriented beliefs, $J$ = 13636, $z$ = 5.31, $r$ = .33. Therefore, we can refer to an order of rank of the three belief profiles.

### 4.3.3 Relationships between belief profiles and CPD activities

Table 7 presents the scores of the three CPD activities for each belief profile. The Kruskal-Wallis test showed that the three CPD activities differed significantly ($p$ < .01) across belief profiles: updating activities ($H$(2) = 12.20), reflective activities

($H(2) = 27.66$) and collaborative activities ($H(2) = 18.80$). In the Mann-Whitney tests (see Table 8), it appeared that the three belief profiles differed significantly on reflective activities. For the updating activities, the STO profile differed from the STOSMO profile, as did the SMO profile, but the SMO and STO profiles did not differ significantly from each other. With regard to collaborative activities, the SMO profile differed from the STO profile and from the STOSMO profile, but the differences between the STO and STOSMO profiles were not significant.

Jonckheere's tests of possible trends in the data revealed small but significant results: As teachers move into higher ranked belief profiles (from SMO to STO to STOSMO), the medians of all three CPD activities increased (see Table 7): updating activities, $J = 12230$, $z = 3.52$, $r = .22$, reflective activities, $J = 12625$, $z = 4.99$, $r = .31$, and collaborative activities, $J = 12255$, $z = 3.93$, $r = .25$. That is, the higher the belief profile is ranked, the higher the teacher's participation in CPD.

***Table 7***
*Means and medians for CPD activities per belief profile (N = 242).*

| | *Cluster 1 SMO profile (n=51)* | | *Cluster 2 STO profile (n=73)* | | *Cluster 3 STOSMO profile (n=118)* | |
|---|---|---|---|---|---|---|
| | M | Mdn | M | Mdn | M | Mdn |
| Updating activities | .65 | .65 | .67 | .65 | .70 | .70 |
| Reflective activities | .54 | .54 | .58 | .56 | .61 | .62 |
| Collaborative activities | .61 | .61 | .66 | .66 | .69 | .69 |

***Table 8***
*Results of the Mann-Whitney tests comparing the CPD activities between belief profiles.*

| | *Updating activities* | | | *Reflective activities* | | | *Collaborative activities* | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | z | r | U | z | r | U | z | r |
| SMO profile – STO profile | 1634 | -1.16 *ns* | -.10 | 1356 | -2.58 | -.23 | 1279 | -2.97 | -.27 |
| SMO profile – STOSMO profile | 2103 | -3.11 | -.24 | 1572 | -4.93 | -.38 | 1788 | -4.19 | -.32 |
| STO profile – STOSMO profile | 3400 | 2.45 | -.17 | 3181 | -3.04 | -.22 | 3708 | -1.61 *ns* | -.12 |

## 4.4 Conclusions and discussion

With this study, we have explored the relationship between teachers' beliefs about learning and teaching and their participation in CPD. The mean scores of teachers' beliefs show an equal endorsement of both student and subject matter orientations, in line with the prediction that teachers exhibit characteristics of both views

(OECD, 2009; Tondeur et al., 2008; Van Driel et al., 2007). It also confirms the view that considers the two belief orientations as two distinct dimensions of teachers' beliefs about learning and teaching.

With regard to participation in the three CPD activities, the teachers in our study showed significantly more participation in updating and collaborative activities than in reflective activities (see also Dijkstra, 2009; Kwakman, 2003; Van Eekelen, 2005). The explanation for this finding might involve the nature of reflection, which is active and problem solving, but which in practice can tend to overemphasise shortcomings and anomalies (Korthagen, 2012) and turn into its more passive and maladaptive counterpart, self-rumination (Takano & Tanno, 2009). To prevent this shift, a teacher might decide to participate less in reflection than in updating or collaboration.

Pertaining to the question of whether teachers can be grouped according to their belief structures, we succeeded in identifying three distinctive, ascending (i.e., roughly ascending scores on the belief dimensions) teacher profiles (see Vogels, 2009). Teachers in the Netherlands obviously differ in their belief structures. Half of them belong to the combined STOSMO profile, with the highest scores on both dimensions, such that they fulfil both roles as knowledge experts and competent deliverers of knowledge, as well as facilitators and activators of students' learning process, as recommended by the European Commission (2010) and Verloop (2003). The other half of teachers belong to the STO (29%) or SMO (20%) profile, with lower scores on one and dominance of the other role.

Our examination of the link between the belief profiles and teachers' participation in CPD, showed several significant relationships: The higher the rank of the belief profile (i.e., higher scores on subject matter and student orientation), the higher the teacher's participation in CPD. The SMO profile scored significantly below the mean scores of the CPD activities (except for updating), the STO profile score was comparable to the mean scores and the STOSMO profile scored significantly beyond the mean scores (cf. collaboration). This result partly confirmed the findings from previous research (Becker & Riel, 2000; Kubler Laboskey, 1993; OECD, 2009; Van Veen et al., 2001; Van Veen & Sleegers, 2006). We found symmetry between teachers' student orientation and their own learning (a higher student orientation means higher participation in CPD). However, we could only partially confirm the link between teachers' subject matter orientation and a lack of interest in teachers' own learning (the higher the subject matter orientation, the lower the participation in CPD). A high subject matter orientation combined with a low student orientation (SMO profile) resulted in low CPD participation; however, the desirable STOSMO profile also encompassed a high subject matter orientation,

in this case combined with a high student orientation. Therefore, the belief profile aspect that appears most crucial in relation to participation in CPD seems to be the level of student orientation. Subject matter orientation cannot be neglected though, because teachers must fulfil both roles, preferably at the highest levels.

### 4.4.1 Limitations and further research

This study has some limitations that suggest directions for research. In particular, we only hint at the connections between teacher beliefs about learning and teaching and their participation in CPD activities, which is acceptable for this early, explorative study. It limits the interpretation of these findings in terms of their implications for teachers and teaching though. Further investigations are needed into the relations among teachers' beliefs about learning and teaching, their actual participation in CPD and their teaching practice and students' learning outcomes. Furthermore, in this study we describe the connections between teacher beliefs and their participation in CPD activities, rather than attempting to explain them. Further investigations with larger samples are needed to provide clarity into teacher-related factors such as subject matter, years of experience, time and type of initial teacher education, as well as insights into context-related factors, such as the school climate and educational leadership. These investigations might provide explanations of the connections we found. Another related area for research would be the interconnections across the different types of beliefs: about learning and teaching, underlying epistemological beliefs about the nature of knowledge and learning (Schommer, 1998) and self-efficacy beliefs (Bandura, 1986), which should have positive relationships with teachers' participation in CPD (Bandura, 1993; Geijsel et al., 2009; Goddard et al., 2000; Runhaar et al., 2010). Do all three types of beliefs connect in a belief system (Pajares, 1992), in what way and how do the resulting belief systems relate to teachers' participation in CPD and teaching practices, as well as students' learning outcomes?

Other limitations to this study include its geographic boundary, its reliance on self-reports, and congruency issues between beliefs and practices (Van Cooten & Van Bergen, 2009). Our measures of beliefs about learning and teaching also could be more fine-grained (Canrinus, 2011). The way we measured participation in CPD warrants further study; in practice, teachers combine different CPD activities, such as reflection and collaboration when 'I ask my colleagues to attend some of my lessons in order to get feedback on my teaching'. Yet we divided the items for the updating, reflective and collaborative activities into three separate sets, which fails to account for some overlap in CPD activities. Our measure of participation in CPD also did not include any information about the content, quality or depth of learning (Vermunt & Endedijk, 2011),

Longitudinal studies also will be required to determine if interventions to enhance teachers' reflections on their beliefs about learning and teaching, in conjunction with participation in CPD, really lead to sustained change (Evans & Kozhevnikova, 2011).

### 4.4.2 Practical implications

Despite these limitations, the findings of this study have some key implications. In particular, the belief profiles we revealed and their relationships with teachers' participation in CPD represent important findings from the perspective of teacher quality and the quality of student learning in Dutch education. Teachers with an SMO profile (20%) rarely engage in reflection, and their participation in collaboration is significantly lower than that of teachers from the two other profiles. They, along with teachers with an STO profile (29%), should be encouraged to move toward a STOSMO profile. Considering belief characteristics, we must ask if adjustments or changes in beliefs are possible, and if so, how? Substantial literature on 'teacher change' (e.g., Borko & Putnam, 1996; Clarke & Hollingsworth, 2002; Gow & Kember, 1993; Guskey, 2002; Richardson, 1998) gives us some indications. In teacher change theories (Clarke & Hollingsworth, 2002; Desimone, 2009; Guskey, 2002), both practices and beliefs become objects of reflection (Richardson, 1998). Because beliefs tend to be implicit, teachers need a language for talking and thinking about their own practices (Freeman, 1991). They also need support to make their beliefs explicit, through opportunities to confront the potential inadequacy of their beliefs and the provision of new information that they can examine, elaborate and integrate into their existing systems of knowledge and beliefs (Borko & Putnam, 1996). This examination and, if necessary, adjustment of beliefs should start in teacher education programs (Brownlee, 2004; Richardson, 2003; Tillema, 2000).

Suitable CPD activities for (prospective) teachers, in conjunction with explicit examination of beliefs, include learning studies (Lo, Pong, & Chik, 2005) and action research projects (De Vries, Beijaard, & Buitink, 2008; Ponte, 2002b). In learning studies, a group of teachers observes live classrooms and collects data on teaching and learning, which they collaboratively analyse, to improve students' learning of specific objects and to facilitate teachers' learning in authentic situations and in collaboration with others (Lewis, Perry, & Murata, 2006). In action research projects (De Vries et al., 2008), experienced and student teachers work closely together, developing, applying and evaluating new educational practices based on teaching and learning issues selected by the experienced teachers.

A suitable working and learning context for (prospective) teachers may be a school that is organised as a learning environment for both students and (with a shared

vision of education, focus on learning by students, and sufficient time and support) teachers (Little, 2006; Richardson, 1998). Review articles by Waslander (2007), Van Veen et al. (2010) and Lomos, Hofman, and Bosker (2011) concur. The latter researchers also find small but positive effects on students' learning outcomes.

Because teachers are crucial to education, and their participation in CPD is an important way to increase their quality, as well as the quality of schools and student learning, knowledge about how teachers' beliefs about teaching and learning is of great importance. We need to understand how teachers differ in these beliefs, the relation between these beliefs and teachers' participation in CPD and ways to enhance teachers' participation in CPD, in conjunction with explicit examinations of and, if necessary, adjustments to beliefs.

# Chapter 5
# **Profiling teachers' continuing professional development**

*This chapter focuses on experienced teachers' concrete learning behavior or continuing professional development (CPD). In general, experienced teachers vary in their participation in learning activities. Therefore, this chapter examines whether they can be grouped according to their reported level of participation in learning activities. Then, the characterization of these groups by beliefs about learning and teaching, gender and years of teaching experience is investigated. A cluster analysis produced three distinctive CPD profiles, reflecting relatively low, medium, and high participation in the three learning activities. The greater teachers' participation in learning activities, the more student oriented those teachers are. In addition, female teachers participate significantly more in learning activities compared with male teachers. For years of teaching experience a weak correlation was found with reflection: as teachers have more teaching experience, they reflect less.*

This chapter is based on:

De Vries, S., Jansen, E.P.W.A., & Van de Grift, W.J.C.M. (2013). Profiling teachers' continuing professional development and the relation with their beliefs about learning and teaching. *Teaching and Teacher Education, 33*, 77-89.

## 5.1 Introduction

In most Western countries, after their initial education, teachers are expected to continue learning throughout their careers, to adapt to the changing needs of their society and its children (Day & Sachs, 2004). Such continuing professional development (CPD) is perceived as an important way to improve schools, increase teacher quality, and enhance student learning (Day, 1999; Hargreaves, 2000; Opfer & Pedder, 2011; Verloop, 2003). Important CPD activities for teachers include updating their knowledge and skills, reflective activities, and collaboration (Schraw, 1998; Timperley, Wilson, Barrar, & Fung, 2007; Verloop, 2003). That is, updating activities provide a basic grounding for reflection and collaboration (Cheetham & Chivers, 2001); reflective activities in turn appear essential for professional growth (Eraut, 1994; Schön, 1983). But there is also a growing awareness of the potential of teacher collaboration for encouraging teacher learning (Cordingley, Bell, Thomason, & Firth, 2005b; Levine & Marcus, 2010; Westheimer, 2008).

With regard to teachers' actual participation in CPD, countries adopt different policies; in the United States for example, state laws and regulations mandate that teachers complete continuing education to renew their licenses, and the most recent educational reforms include nationwide investments in professional development to improve school and student outcomes (Jaquith, Mindich, Wei, & Darling-Hammond, 2010). Although many states have adopted standards for teachers' CPD, the teachers' access to and participation in professional development varies widely across the country (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Jaquith et al., 2010; Little, 2004). Across Europe, policies related to participation in CPD similarly differ. For example, the United Kingdom and Germany explicitly oblige teachers to engage in professional development activities; in Poland, Portugal, Slovakia, Slovenia, and Spain, CPD is optional but clearly linked to career advancement and salary increases. In contrast, in France, Iceland, Sweden, and the Netherlands, CPD is a professional duty, but participation is optional and unlinked to either career advancement or salary increases (Scheerens, 2010). For example, teachers in the Netherlands have professional autonomy to determine whether they will take part in CPD; in practice they vary widely in the extent to which do so (Aarts & Waslander, 2008; Bakkenes, Vermunt, & Wubbels, 2010; Diepstraten et al., 2011; Van Driel, 2006; Vogels, 2009). In particular, it appears that teachers engage less often in reflective activities, compared with updating knowledge or collaboration (Dijkstra, 2009; Kwakman, 2003; Van Eekelen, 2005). In contexts in which CPD is a professional duty, but not a mandatory one, what factors might explain why some teachers participate more in CPD than others?

Several researchers suggest some influences, both personal and contextual, that might affect teacher learning (e.g., Geijsel, Sleegers, Stoel, & Krüger, 2009; Kwakman, 2003; Lohman, 2006; Runhaar, Sanders, & Yang, 2010). An important though insufficiently addressed personal factor is teachers' beliefs, which provide "the best indicators of the decisions individuals make throughout their lives" (Pajares, 1992, p. 307). Beliefs guide thought and behavior (Borg, 2001) and provide a filter for screening knowledge and experiences for meaning (Nespor, 1987; Pajares, 1992). For example, teachers' beliefs about learning and teaching relate closely to their instructional decisions (Calderhead, 1996). Perhaps a comparable relationship exists between teachers' beliefs about learning and teaching and their own learning activities or CPD. Epistemological belief theory in adult learning posits that people's working and learning efforts are interrelated and influenced by the same underlying beliefs (Schommer, 1998). Some researchers also suggest a relation among whether, how, and what teachers learn and their beliefs about learning and teaching (Bolhuis & Voeten, 2004; Opfer & Pedder, 2011; Opfer, Pedder, & Lavicza, 2011; Van Eekelen, Vermunt, & Boshuizen, 2006; Vermunt & Endedijk, 2011). However, research on teachers' CPD and teachers' beliefs has appeared separately (Opfer & Pedder, 2011), and scarce empirical studies consider the relationship between teachers' CPD and their beliefs about learning and teaching. This study seeks to bridge this gap by empirically exploring the relationship between teachers' CPD and their beliefs about learning, which we classify as student-oriented and subject matter-oriented beliefs (Van Driel, Bulte, & Verloop, 2007).

First, to identify current differences in CPD across teachers, we investigate whether we can group teachers according to their reported level of participation in three CPD activities: updating, reflection, and collaboration. Second, we examine how these resulting teacher profiles relate to student-oriented and subject matter-oriented beliefs. Third, to characterize the CPD profiles further, we include some background variables in our study, namely, years of experience and gender.

### 5.1.1 Teachers' continuing professional development (CPD)

Only since the 1980s, and as a result of changing economic, social, and educational developments, have teachers been expected to continue to learn over the course of their careers (Beijaard, Korthagen, & Verloop, 2007; Hargreaves, 2000). The power of globalization has made such educational developments generally comparable in most developed nations (e.g., Australia, Singapore, North America, and Europe; Day & Sachs, 2004). Until then, the dominant view held that an autonomous, teaching-oriented professional made all decisions about the curriculum, teaching, learning, assessment, and his or her own professional development. Teachers

chose to be "restricted" or "extended" professionals (Hoyle, 1980), such that they relied on intuitive and classroom-based thought and practices, or accounted for the broader educational context and a wider range of professional activities, respectively. The primary form of professional development available to these teachers was staff development or in-service training, which usually consisted of one-shot workshops or short-term courses (Scheerens, 2010; Villegas-Reimers, 2003).

In contrast, modern teachers are learning-oriented, adaptive experts, able to teach increasingly diverse sets of learners, knowledgeable about student learning, competent in complex academic content, and skillful in the craft of teaching (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009; Vermunt & Verloop, 1999). The knowledge, skills, and attitudes needed to teach, in the role of an adaptive expert, cannot be fully developed in pre-service education programs; instead, continuing professional development is an essential and integral part of today's teaching profession (Feiman-Nemser, 2001). In turn, CPD is no longer an option but rather an expectation of all professionals (Day & Sachs, 2004).

Several related terms also appear in relevant literature, such as teacher development, in-service education and training, staff development, career development, human resource development, professional development, continuing education, and lifelong learning (Bolam & McMahon, 2004). These terms often have overlapping meanings and are defined variously by different writers. For this study, we adopt a working definition proposed by Day (1999):

> Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct benefit to the individual, group or school and which contribute, through these, to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purposes of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning and practice with children, young people and colleagues through each phase of their teaching lives. (p. 4)

This definition highlights the separate but interrelated aspects of CPD, including its functions, the relationship between the individual and the collective, and CPD activities.

First, teachers' CPD may have different functions, oriented toward maintenance, improvement, or change (Day & Sachs, 2004). Teachers must learn continuously to

stay up to date with new trends and learn fresh strategies, techniques, and methods to meet new classroom challenges (Cheetham & Chivers, 2001); to improve themselves and turn their schools into learning communities (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006); and to respond to educational change (Fullan, 2007).

Second, as the latter functions emphasize, there is a symbiotic relationship between individual and organizational needs. In a professional learning community, which features a focus on student learning, shared values and vision, collective responsibility, reflective professional inquiry, collaboration, and group and individual learning (Stoll et al., 2006), teachers take responsibility for their own actions and acquire the necessary knowledge, skills, and repertoire of activities to increase their participation in the school environment. By participating in varied professional activities, teachers stimulate both their own professional development and the development of the school, such that they contribute significantly to improving educational practice. Furthermore, in terms of educational innovation, learning by individual teachers, by teams, and by the organization are all closely related outcomes (Miedema & Stam, 2008). Third, we discuss CPD activities in substantial detail in the next section.

### CPD activities

The CPD activities that individual teachers undertake, actively and voluntarily over the course of their career, can be classified into three groups: updating knowledge and skills, reflection on experiences, and collaboration with colleagues (Schraw, 1998; Timperley et al., 2007; Verloop, 2003). Research pertaining to the effectiveness of teachers' CPD activities for improving their quality and teaching practices indicates that all three activity types are effective (Cheetham & Chivers, 2001; Timperley et al., 2007). Participation in diverse CPD activities thus appears essential (Bolhuis, 2009; Schraw, 1998; Timperley et al., 2007), assuming a continued focus on lesson-related content, such as subject matter, general pedagogical knowledge, or pedagogical content knowledge (Van Veen, Zwart, Meirink, & Verloop, 2010).

If we consider updating activities in particular, during their education, teachers develop a personal practical knowledge base (Connelly & Clandinin, 1988; Van Driel, Beijaard, & Verloop, 2001), or, in other words, their practitioner knowledge (Hiebert, Gallimore, & Stigler, 2002) that enables them to integrate experiential knowledge, formal knowledge, and beliefs, across subject matter, general pedagogical knowledge, and pedagogical content knowledge fields. After this initial teacher education, experiential knowledge, which often remains implicit

(Zanting, Verloop, & Vermunt, 2001), expands through increasing teaching practice, but the formal knowledge base still requires constant, intentional updates to reflect continuing societal and educational developments and innovations. Furthermore, updating activities support other professional activities, such as reflection, because sufficient theoretical knowledge is a necessary condition for meaningful reflection (Van de Ven, 2009; Verloop, 2001). According to Cheetham and Chivers (2001), updating activities offer a basic grounding for essential specialist knowledge and theory for reflection and collaboration. For this study, we consider reading (e.g., professional literature, newly published textbooks, educational sites on the Internet) and schooling (e.g., courses, workshops, conferences, training, consultation in or outside the school) as activities teachers undertake to update their knowledge and skills after their initial education.

Reflection in relation to professional activities implies a specialized form of thinking, applied to deal with a puzzling or curious situation (a problem) to make better sense of the situation (Dewey, 1933). Schön (1983) calls this form "reflection-on-action" and defines it as a deliberate process, developed and purposely used to reconsider existing knowledge, beliefs, possibilities, ideas, and actions. In contrast, "reflection-in-action" constitutes an almost subconscious process that experts develop and refine through their learning with experience. Reflection is a critical professional activity (Eraut, 1994; Schön, 1983) and vitally important to CPD (Cheetham & Chivers, 2001), because it helps teachers make their implicit or tacit knowledge and beliefs explicit, such that they gain control over their routine actions in the classroom and can make changes if necessary (Schön, 1983). Some teachers may be hesitant to engage in reflective activities (Runhaar et al., 2010; Schön, 1983), for fear that the information they reflect on might affect their self-image by overemphasizing their shortcomings or anomalies (Korthagen, 2012). We emphasize the active and problem-solving nature of reflection and thus focus on reflection-on-action in this study. Teachers who engage in conscious reflection-on-action processes to identify problematic issues in their practice and pursue solutions that bring about valued effects for student learning are "reflective practitioners" (Copeland, Birmingham, De La Cruz, & Lewin, 1993; Schön, 1983). Reflective practitioners may act individually but benefit from feedback from colleagues or students, or by carrying out practical research individually or in collaboration with colleagues (Kallenberg, Koster, Onstenk, & Scheepsma, 2007; Ponte, 2002a).

Finally, collaborative activities occur with colleagues both within and outside the school; it is a highly effective form of CPD (Bakkenes et al., 2010; Clement & Vandenberghe, 2000; Cordingley et al., 2005b) that provides (1) supportive and

therapeutic benefits, which can reduce stress and help improve confidence (Cheetham & Chivers, 2001); (2) feedback, new ideas, and challenges (Kwakman, 2003; Putnam & Borko, 2000); (3) greater enthusiasm for collaborative working; (4) a greater commitment to changing practice; and (5) a framework for shaping the learning environment and thus directly and indirectly (via classroom-level processes) affecting student performance (OECD, 2009; Westheimer, 2008). For this study, we distinguish two kinds of collaborative activities by teachers (OECD, 2009): exchange activities (e.g., discussing teaching problems, exchanging instructional materials) and professional collaboration (e.g., joint preparation of educational materials, team teaching).

As individual learners, teachers should take responsibility for and participate actively in all three activities, whether externally provided or job-embedded. On the one hand, these activities are interrelated and interdependent, such that updating activities are conducive to and form a basic grounding for reflection and collaboration; updating and reflective activities can be either individual or collaborative; and collaborative activities provide teachers with feedback, which encourages reflection. On the other hand, the three activities have different characteristics and thus represent complements of one another. However, teachers presumably vary in the extent to which they participate in each CPD activity. To grasp the differences in their CPD, we investigate whether teachers might be grouped according to their reported level of participation in the three CPD activities, which should produce a CPD profile for each particular teacher. Exploring these combinations in turn might provide insights into the different CPD profiles.

Some other relevant attempts to define teacher types include Joyce and Showers (1995), who identify four types of teachers on the basis of their level of activity in professional development, within the specific scope of school-based professional development programs. They find that 10% of teachers demonstrate high activity, another 10% are somewhat less active, whereas 70% are passive consumers and 10% are reticent consumers. Becker and Riel (2000) focus on professional engagement, defined as a teacher taking the effort to affect the teaching that occurs in classrooms other than his or her own, through within-school informal interactions, beyond school contacts and leadership activities (i.e., collaboration in a broad sense). They identified four types of teachers: teacher leaders (2%), teacher professionals (10%), interactive teachers (29%), and private practice teachers (58%). Pedder (2007) uses five distinctive professional learning practices and value profiles, with a focus on teachers' perceptions of professional learning practices and the extent to which they believe each takes place in their school, not in their

own actions. We extend this line of research by addressing teachers' perceptions of their own participation in the three CPD activities.

To improve our characterization of the CPD profiles, we include background variables in our study too, namely, gender and years of experience. Previous research has suggested that female and male teachers differ systematically in their participation in CPD (De Brabander, Vinken, & Van Wolput, 2011; OECD, 2009), especially in reflective activities (Runhaar et al., 2010). Becker and Riel (2000) reveal that the most professionally engaged teachers tend to be women. To measure years of experience, we rely on the five phases of the teacher career cycle (Huberman, 1992): 1–3 years (launching a career), 4–6 years (stabilization), 7–18 years (new challenges, new concerns), 19–30 years (reaching a professional plateau), and 31–40 years (the final phase). In each stage, teachers vary in their concerns and commitment, including their professional development behavior and needs (Day & Sachs, 2004; Huberman, 1992; Richter, Kunter, Klusmann, Ludtke, & Baumert, 2011). Becker and Riel (2000) find that professionally engaged teachers tend to be somewhat more experienced. However, the more years of experience teachers have, the less likely they are to engage in reflective activities (Van Woerkom, Nijhof, & Nieuwenhuis, 2002). According to Grangeat and Gray (2007), beginners reflect more than experienced teachers.

### 5.1.2 Teachers' beliefs about learning and teaching

In line with advances in cognitive psychology, researchers have become increasingly interested in teachers' thought processes (Fang, 1996). Early educational research tended to focus exclusively on teachers' characteristics, actions, and observable effects on student learning. But broader studies of teachers' thought processes also include teachers' theories and beliefs, which constitute an important part of their general knowledge, through which they perceive, process, and act on information available in the classroom (Clark & Peterson, 1986). According to Shulman (1986), three dimensions of general knowledge are involved in the process of teaching: subject matter content knowledge, pedagogical content knowledge, and general pedagogical knowledge. Other researchers have added a fourth dimension, personal practical knowledge (Connelly & Clandinin, 1988; Van Driel, Beijaard, & Verloop, 2001), which constitutes

> a term designed to capture the idea of experience in a way that allows us to talk about teachers as knowledgeable and knowing persons. Personal practical knowledge is in the teacher's past experience, in the teacher's present mind and body, and in the future plans and actions. Personal practice knowledge is found in the teacher's practice. It is, for any teacher,

> a particular way of constructing the past and the intentions of the future to deal with exigencies of a present situation. (Connelly & Clandinin, 1988, p. 25)

The notion thus integrates both knowledge and beliefs; efforts to distinguish between them have difficulty pinpointing where knowledge ends and beliefs begin (Clandinin & Connelly, 1987). In an analysis of 25 teacher belief studies, Kagan (1992) suggests making a distinction between facts (knowledge) and opinion (belief). Pajares (1992, p. 325) also argues that "knowledge and beliefs are inextricably intertwined, but the potent affective, evaluative and episodic nature of beliefs makes them a filter through which new phenomena are interpreted." He complains that researchers too often define beliefs according to their own agendas, demanding better agreement about the meaning and conceptualization of beliefs. More than a decade later, no such consensus exists; rather, the concept has acquired rather fuzzy usage (Borg, 2001). Borg (2001) cites some common features though: truth elements, the relationship between beliefs and behavior, conscious versus unconscious beliefs, and beliefs as value commitments. We thus use Borg's definition for this study:

> To sum up, a belief is a proposition which may be consciously or unconsciously held, is evaluative in that it is accepted as true by the individual, and is therefore imbued with emotive commitment; further, it serves as a guide to thought and behavior. (Borg, 2001, p. 186)

Teachers' beliefs about learning and teaching are the propositions about learning and teaching that a teacher holds to be true, which in turn guide to her or his thought and behaviors. A specific feature of beliefs about learning and teaching is that often they tend to be robust. That is, over time and with greater use, beliefs become robust; the earlier a belief is acquired, the more difficult it is to alter (Murphy & Mason, 2006; Pajares, 1992). Teachers' beliefs about learning and teaching develop during the many years teachers spend at school, first as students, then as student teachers, and finally as teachers (Bolhuis, 2000; De Vries, 2004; Hargreaves, 2000; Kelchtermans, 2008; OECD, 2009).

In reference to teachers' beliefs about learning and teaching, educational research often uses a distinction between subject matter and student orientations (Meirink, Meijer, Verloop, & Bergen, 2009; Van Driel et al., 2007). The same distinction has been described using other terms too, such as content versus student (Denessen, 1999), transmission of knowledge by the teacher versus student learning (De Vries, 2004; Van Veen, Sleegers, Bergen, & Klaassen, 2001), traditional versus process-oriented (Bolhuis & Voeten, 2004), traditional versus constructivist (Becker & Riel,

2000; Tondeur, Hermans, Van Braak, & Valcke, 2008), and reception/direct transmission versus constructivist (OECD, 2009). Regardless of the terminology, this distinction refers to differences in views of learning and teaching methods. A subject matter orientation implies more traditional, 'transmission' teaching, with a focus on transmitting content/knowledge about the subject matter to student recipients (Hargreaves, 2000). The teacher plays the central role as the knowledge expert and deliverer, ensures calm and concentration in the classroom, and does not orient her- or himself to the needs of the individual students but rather treats the whole class as a kind of collective student. A student orientation, as more widely promoted today by most educational researchers and teacher educators (OECD, 2009), instead is based on constructivist theories of knowledge and learning, focused on the development of skills and competencies. Students thus actively construct knowledge individually and in social interactions with others; teachers account for differences among students (Pieters & Verschaffel, 2003). Such constructive visions of learning and teaching demand that teachers develop a strong conceptual understanding of the subject matter. To create effective learning environments for students with different backgrounds and conceptions, teachers also need a wide repertoire of general pedagogical knowledge about basic principles, as well as pedagogical content knowledge involving the subject matter (Borko & Putnam, 1996; Shulman, 1986). This teacher thus must fulfill both roles, as knowledge expert and competent deliverer of knowledge and as the facilitator and activator of students' learning processes (European Commission, 2010; Verloop, 2003).

Although student- and subject matter-oriented beliefs may appear contradictory or as two opposite ends of the same scale (Becker & Riel, 2000; Boulton-Lewis, Smith, McCrindle, Burnett, & Campbell, 2001; Kember, 1997), most studies of beliefs about teaching and learning note that teachers actually demonstrate characteristics of both views and that the scales are independent (OECD, 2009; Tondeur et al., 2008; Van Driel et al., 2007). Teachers thus can score high on both scales. In turn, we consider the two belief orientations as two distinct dimensions of teachers' beliefs about learning and teaching.

### 5.1.3 Relationship of teachers' CPD and teachers' beliefs about learning and teaching

According to epistemological belief theory related to adult learning, people's beliefs about the nature of knowledge and learning influence their learning and their working (Schommer, 1998). That is, learning and working are interrelated and influenced by the same underlying beliefs pertaining to the nature of knowledge (i.e., separate bits and pieces versus highly interrelated concepts) and learning (i.e.,

inherited and unchangeable ability versus an ability that can improve over time). For teachers, learning (CPD) and working (teaching) may be interrelated as well, both influenced by the same underlying beliefs. With respect to the nature of the relationships between teachers' CPD and the two types of beliefs, some empirical studies offer further indications.

For example, Becker and Riel (2000) study professional engagement (see their definition in Section 1.1) in relation to teachers' traditional versus constructivist beliefs. Among 4 083 primary and secondary teachers, they find that the more professionally engaged teachers are, the more likely they are to have constructivist beliefs, whereas less professionally engaged teachers are more likely to express traditional beliefs. Van Veen et al. (2001) investigate, among other things, the relationship between beliefs about learning and teaching and the extent of collaboration by 452 secondary school teachers. They find strong relations between subject matter-oriented beliefs and little or no collaboration, as well as between student-oriented beliefs and more collaboration. On the basis of a small qualitative study (six secondary school teachers), Van Veen and Sleegers (2006) argue that subject matter-oriented teachers perceive collaboration with colleagues as less relevant, whereas for student-oriented teachers, such collaboration is relevant, because of their perceptions of their joint responsibility for students and need for potential sources of support and advice. Although these three studies all pertain to one CPD activity (i.e., collaboration in the broad sense), they consistently suggest positive relationships between participation in CPD and student-oriented beliefs but negative links between participation in CPD and subject matter-oriented beliefs. These findings reappear in the OECD's (2009) large-scale study of 70 000 lower secondary education teachers across 24 countries. Although the correlations in that study were weak, teachers' CPD (operationalized as participation in workshops or courses, mentoring, and networks for professional development) related positively to student orientation and negatively to subject matter orientation across countries. In a somewhat related study of 260 higher secondary school teachers, Bolhuis and Voeten (2004) assess the relationship between teachers' conceptions of student learning (traditional versus process-oriented) and their own learning (also traditional versus process-oriented). Teachers' conceptions of student learning seemed largely congruous with their conceptions of their own learning.

These studies offer some insight into the possible relationships between teachers' CPD and the two types of beliefs about learning and teaching; namely, symmetry could exist between teachers' own learning activities (i.e., more versus less participation in CPD) and teachers' orientation toward student learning (i.e.,

student-oriented versus subject matter-oriented beliefs). However, no studies focus specifically on the relationship between teachers' participation in CPD, as defined and operationalized in Section 5.1.1., and their beliefs about learning and teaching. Nor has research explored the existence of teachers' CPD profiles or investigated the relationship between CPD profiles and beliefs about learning and teaching. Therefore, we develop four research questions to guide our investigation of the relationships between teachers' participation in CPD and their beliefs about learning and teaching:

1 What do teachers report about their participation in the three CPD activities and their beliefs about learning and teaching?
2 Which patterns (profiles) emerge with regard to teachers' participation in CPD activities?
3 What is the relationship between the CPD profiles and teachers' beliefs?
4 What is the relationship of both CPD profiles and separate CPD activities with years of experience and gender?

## 5.2 Method

### 5.2.1 Sample

We conducted this research among teachers working at four secondary schools affiliated with the School of Education in the northern part of the Netherlands. The School of Education, a professional development school for prospective teachers, seeks to enhance the CPD of in-service teachers as well. The administrations of the schools involved were motivated to participate in this research, because they hoped to use the results to update their staff policies. At the time of the data collection (April/May 2010), school administrators sent an introductory recommendation e-mail, and then we mailed e-mails outlining the goals and procedure for the study, with a link to an electronic questionnaire, to all 1050 teachers in these four schools. The questionnaire was completed by 260 respondents (average response rate of 25%), which is about average for a web-based survey (Sheehan, 2001) but seemingly low for this population. The distribution by gender featured 49% male and 51% female respondents. Their average age was 46.7 years (SD = 10.8), and they had 18.8 years of experience (SD = 11.7), on average, distributed as follows: 8% had 1–3 years, 9% had 4–6 years, 34% had 7–18 years, 28% had 19–30 years, and 21% had 31 or more years of experience. Approximately one-third (30%) of the teachers were fully qualified, 48% had a grade-two qualification (i.e., to teach junior forms of secondary education), 9% earned qualifications for primary education, 7% were student teachers, and 6%

noted no qualifications. Furthermore, 26% had earned a university qualification (Master's degree), 70% had a high professional education qualification (Bachelor's degree), and 4% cited their lower qualification. According to these gender, age, and qualification statistics, our sample resembles the national distribution of teachers in Dutch secondary education (CAOP Research, 2008).

### 5.2.2 Instruments

The online questionnaire sought to measure five constructs: the CPD activities of updating, reflection, and collaboration and the student- and subject matter-oriented beliefs. To confirm the validity of the items, we asked experts (i.e., school managers and expert teachers in the schools involved) to review and reword some item formulations. The items were formulated in Dutch, as clearly and concisely as possible. To encourage respondents to represent their behavior and beliefs accurately and avoid socially desirable answers, the item formulations were direct and in first-person voice (CPD activities), or else were introduced by the phrase, "In my teaching it is important …" (beliefs about learning and teaching). Anonymity was guaranteed.

To measure teachers' participation in CPD, we adapted three scales and their corresponding items from qualitative research by Kwakman (1999), as updated by a pilot study conducted by Dijkstra (2009). The activity items, pertaining to updating (11 items), reflective (13 items), and collaboration (16 items), appeared as three separate sets, all measured with four-point Likert scales (1 = never, 2 = rarely, 3 = regularly, 4 = very often), as we show in Table 3 in Chapter 3 (p. 31). Due to its low item-retest correlation, we removed item 9 (.16) from the updating scale. A reliability analysis confirmed that all three scales were reliable (updating Cronbach's $\alpha$ = .75; reflection Cronbach's $\alpha$ = .78; collaboration Cronbach's $\alpha$ = .86).

For beliefs about learning and teaching, we used 14 items adapted from Denessen (1999) and Vogels (2009). To minimize socially desirable response biases, we presented the items in random order as a single set of items. Respondents indicated the extent to which each item applied to them, using a four-point rating scale (1 = not applicable, 2 = somewhat applicable, 3 = fairly applicable, 4 = fully applicable). With exploratory factor analysis, we searched for different data orientations. In addition, we conducted a principal component analysis on the 14 items with orthogonal rotation (Varimax). The initial analysis provided eigenvalues for each component. In a scree plot and using eigenvalues over Kaiser's criterion of 1 and the percentage of variance explained (51.3%), we derived two factors. Table 1 in Chapter 3 (p. 29) reveals how the items load on these two factors. We removed two items (13 and 14) that loaded on both factors. The item clustering suggested that component 1 represented subject matter-oriented beliefs,

including instruction with a focus on the transmission and learning of subject matter content/knowledge, while students listen. Component 2 instead referred to student-oriented beliefs, featuring instruction focused on the development of skills and competencies, active and collaborative learning, and accounting for student differences. We provide the belief scales, items, and descriptive statistics in Table 2 in Chapter 3 (p. 30). A reliability analysis of the two factors confirmed the reliability of both scales (subject matter orientation Cronbach's $\alpha = .84$; student orientation Cronbach's $\alpha = .80$).

### 5.2.3 Data analysis procedures

To gain insights into how teachers' CPD relates to their beliefs about learning and teaching, we analyzed all five aforementioned scales. Data exploration using the Kolmogorov-Smirnov test showed that the scores—updating $D(242) = .10$, $p < .05$; collaboration $D(242) = .08$, $p < .05$; student-oriented beliefs $D(242) = .15$, $p < .05$; and subject matter–oriented beliefs, $D(242) = .14$, $p < .05$—were significantly non-normal, with the exception of reflective activities, $D(242) = .06$, *ns*. Further investigation also showed a few outliers. Because these outliers varied for each scale, we chose not to remove the cases or correct for the outliers; instead, we used non-parametric tests designed for nonnormally distributed data (Field, 2009). To address the first research question, regarding teachers' participation in the three CPD activities and their beliefs, we computed mean scores and standard deviations. Using Wilcoxon signed-rank tests, we compared teachers' participation in the three CPD activities. Next, we examined the occurrence of different CPD profiles in our sample, related to our second research question, through a cluster analysis that created subgroups (in our case, profiles) of relatively homogeneous cases. Scores on the three CPD scales informed the development of the profiles. With a Kruskal-Wallis test, we then tested for differences between the three CPD activities performed by each of the CPD profiles. Mann-Whitney tests provided post hoc confirmation of the specific differences; Jonckheere's tests also revealed any possible trends in the data. For the third question, regarding the relation between the CPD profiles and the two types of beliefs, we conducted the same tests that we used for the second question: the Kruskal-Wallis test to test for differences between the two belief orientations, Mann-Whitney post hoc tests to locate the differences, and Jonckheere's tests to reveal possible data trends. Finally, the test of the research question pertaining to the relationship between the CPD profiles and the background variables (years of experience and gender) relied on cross-table analyses. To denote the relationship between the separate CPD activities and the background variables for years of experience, we relied on the Kruskal-Wallis test, followed by Jonckheere's tests; for gender, we conducted Mann-Whitney tests.

## 5.3 Results

### 5.3.1 Teachers' CPD and beliefs about learning and teaching

We standardized all the scale scores prior to our analyses; Table 4 contains the mean scores and standard deviations for the three CPD scales and two belief scales. In the comparison of teachers' participation in CPD activities, Wilcoxon signed-rank tests showed that teachers, on average, participated significantly more frequently in updating ($M$ = .68) than in reflective ($M$ = .58) activities, $T$ = 3108, $p$ < .001, $r$ = -.69. as well as significantly more frequently in collaborative ($M$ = .66) than in reflective ($M$ = .58) activities, $T$ = 3601, $p$ < .001, $r$ = -.66. Although the effect was small, teachers tended to participate more frequently in updating activities ($M$ = .68) than in collaborative activities ($M$ = .66), $T$ = 12479, $p$ < .05, $r$ = -.15. From the comparison of teachers' beliefs about learning and teaching, we found an equal endorsement of student-oriented beliefs ($M$ = .86) and subject matter–oriented beliefs ($M$ = .86). The standard deviations of the CPD activities indicated that teachers varied in the extent to which they participated in the activities. Thus, it appears reasonable to explore teachers' CPD using cluster analysis.

***Table 4***

*Mean scores and standard deviations for teachers' CPD activities and teachers' beliefs.*

| *Scale* | *M* | *SD* | *N* |
|---|---|---|---|
| Updating | .68 | .10 | 258 |
| Reflection | .58 | .09 | 251 |
| Collaboration | .66 | .11 | 255 |
| Student-oriented beliefs | .86 | .12 | 258 |
| Subject matter-oriented beliefs | .86 | .11 | 260 |

### 5.3.2 CPD profiles

We ran a cluster analysis on the scores of the three CPD scales with 245 cases. With hierarchical cluster analysis, using Ward's method, we gained a sense of the possible number of clusters, and three clusters emerged from the dendogram. By rerunning the clustering with the *k*-means method, we iteratively estimated the cluster means and assigned each case to the cluster for which its distance from the cluster mean was least. Table 5 contains the scores (means and medians) of the three classification measures of each cluster. The Kruskal-Wallis test showed that the three indicators of teachers' CPD differed significantly ($p$ < .01) across clusters: updating $H(3)$ = 86.37, reflection $H(3)$ = 117.23, and collaboration $H(3)$ = 146.22. Mann-Whitney tests ($p$ < .01) provided a follow-up on these findings (see Table 6).

That is, all three clusters differed significantly from one another across the three CPD scales.

***Table 5***

*Means and medians for the three CPD activities per cluster (N = 245).*

| | *Cluster 1 (n = 59)* | | *Cluster 2 (n = 132)* | | *Cluster 3 (n = 54)* | |
|---|---|---|---|---|---|---|
| | M | Mdn | M | Mdn | M | Mdn |
| Updating | .59 | .60 | .69 | .70 | .76 | .74 |
| Reflection | .50 | .50 | .58 | .58 | .69 | .69 |
| Collaboration | .56 | .56 | .66 | .66 | .79 | .78 |

***Table 6***

*Results of the Mann-Whitney tests comparing CPD activities between clusters.*

| | *Updating* | | | *Reflection* | | | *Collaboration* | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | z | r | U | z | r | U | Z | r |
| Cluster 1 – Cluster 2 | 1102 | -7.94 | -.57 | 1314 | -7.33 | -.53 | 1028 | -8.14 | -.59 |
| Cluster 2 – Cluster 3 | 2409 | -3.48 | -.26 | 1004 | -7.71 | -.57 | 538 | -9.1 | -.67 |
| Cluster 1 – Cluster 3 | 229 | -7.86 | -.74 | 98 | -8.61 | -.81 | 0 | -9.17 | -.86 |

The scores for the clusters in Table 5 also enabled us to typify three types of teachers who differ in their CPD participation. This cluster typification referred to relative positions on the three scales. Thus, the first cluster (24%) was characterized by relatively low (rare or close to rare) participation in the three CPD activities. The middle, and predominant, cluster (54%) scored comparable to the mean scores on all three CPD activities, falling between rare and regular participation in CPD. The third cluster (22%) was characterized by relatively high (regular or close to regular) participation in CPD. Jonckheere's tests revealed significant trends in the data: From the low CPD, continuing to the medium CPD, and then concluding with the high CPD profile, the medians (Table 5) of the separate CPD activities increased for updating activities, $J = 14361$, $z = 9.2$, $r = .58$; reflective activities, $J = 15686$, $z = 11.47$, $r = .73$; and collaborative activities, $J = 16535$, $z = 12.93$, $r = .83$. Therefore, we can refer to a rank order of three CPD profiles.

### 5.3.3 Relation between CPD profiles and beliefs about learning and teaching

In Table 7 we present the means and medians of the two belief orientations for each CPD profile. The Kruskal-Wallis tests showed that participation in CPD was not affected by subject matter-oriented beliefs; however, student-oriented beliefs

differed significantly across CPD profiles, $H(3) = 28.57$, $p = .00$. We followed up with Mann-Whitney tests. The three profiles differed significantly ($p < .01$) in terms of their student-oriented beliefs: Low CPD differed from medium CPD, $U = 2608$, $z = -3.47$, $r = -.25$; medium CPD differed from high CPD, $U = 2482$ , $z = -3.07$, $r = -.23$; and low CPD differed from high CPD, $U = 680$, $z = -5.12$, $r = -.48$. Furthermore, Jonckheere's test revealed a significant trend in the data: As teachers participated more in CPD, their median student-oriented beliefs increased, $J = 11844$, $z = 5.40$, $r = .34$. We thus conclude that a higher CPD profile implies higher student-oriented beliefs.

***Table 7***

*Means and medians for the two types of beliefs about learning and teaching per CPD cluster (N = 238).*

| | *Cluster 1 Low CPD (n = 59)* | | *Cluster 2 Medium CPD (n = 132)* | | *Cluster 3 High CPD (n = 54)* | |
|---|---|---|---|---|---|---|
| | M | Mdn | M | Mdn | M | Mdn |
| Subject matter-oriented beliefs | .86 | .86 | .85 | .82 | .88 | .88 |
| Student-oriented beliefs | .79 | .80 | .87 | .90 | .92 | .95 |

### 5.3.4 Relation between CPD profiles and background variables

We found a significant association between gender and CPD profiles, $\chi^2(2) = 9.5$, Cramer's $V = .20$, $p < .01$. Figure 1 contains a bar chart for CPD profiles and gender, which reveals that male and female teachers were equally well represented in the medium CPD profile, but male teachers appeared overrepresented in the low CPD profile, whereas female teachers were overrepresented in the high CPD profile. Regarding years of experience, according to Huberman's (1992) teacher career cycle, we found no significant differences, $\chi^2(8) = 9.1$, Cramer's $V = .14$, $p = .33$, as depicted in Figure 2.

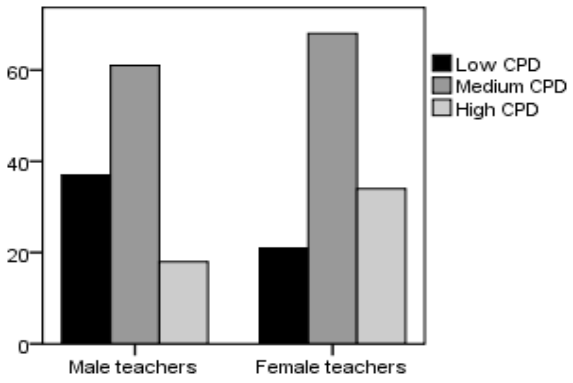



***Fig. 1**. Bar chart for CPD profiles and gender*

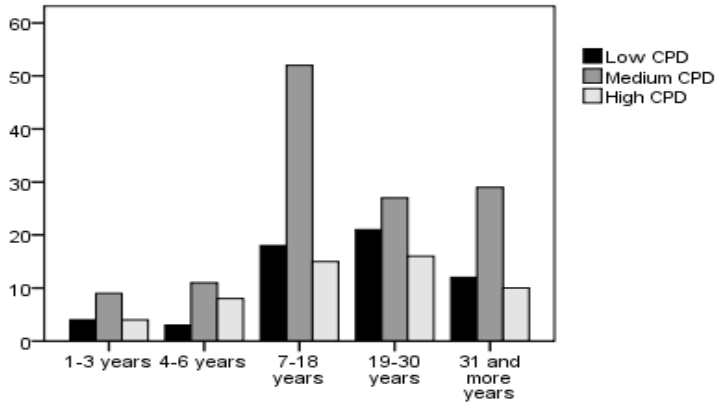



***Fig. 2**. Bar chart for CPD profiles and years of experience*

#### Relation between separate CPD activities and background variables

Mann-Whitney tests for gender showed that female teachers (*Mdn* = .70) participated significantly more in updating activities than male teachers (*Mdn* = .65), *U* = 6375, *z* = -2.68, *p* < .01, *r* = -.17. Female teachers (*Mdn* = .60) also participated significantly more in reflective activities than male teachers (*Mdn* = .56), *U* = 5936, *z* = -2.82, *p* < .01, *r* = -.18. Even after controlling for the effect of the number of working hours—such that female teachers (*Mdn* = 75.5%) indicated

significantly fewer working hours than male teachers (*Mdn* = 100%), *U* = 4063, *z* = -6.83, *p* < .01, *r* = -.43—the differences between female and male teachers in terms of their updating and reflective activities remained significant. We found no significant difference for collaborative activities.

Finally, for years of experience and using the Kruskal-Wallis test, we determined there was no significant effect on the separate CPD activities. However, Jonckheere's test revealed a small, significant trend: As teachers gained more experience, the median of their reflective activities decreased, *J* = 9702, *z* = -2.41, *r* = .15.

## 5.4 Conclusions and discussion

The aim of this study has been to contribute to research on teachers' CPD. In a context in which CPD is not mandatory, we explored the relationship between teachers' CPD, defined as their career-long, job-embedded learning, and their beliefs about learning and teaching, which we classified as student oriented and subject matter oriented. In so doing, we derived three teacher profiles, reflecting relatively low (24%, rare or close to rare), medium (54%, in between rare and regular), and high (22%, regular or close to regular) participation in three CPD activities, namely, updating, reflection, and collaboration. Teachers matching these three profiles differed significantly in their student-oriented beliefs: Greater CPD participation related to more student-oriented beliefs. The differences across the three CPD profiles demonstrated symmetry of teachers' orientation toward their own learning and development—through their updating activities, reflecting about their work, and collaborating with colleagues—with their orientation toward the learning and development of their students. Teachers who themselves are more learning and development oriented thus express more learning and development orientations toward their students. However, we found no relationships between teachers' CPD profiles and their subject matter-oriented beliefs, whether positive or negative. These results partly confirmed findings from previous research (Becker & Riel, 2000; Bolhuis & Voeten, 2004; OECD, 2009; Van Veen et al., 2001; Van Veen & Sleegers, 2006). In a situation in which CPD is a professional duty and not mandatory, teachers' student-oriented beliefs relate to teachers' own learning activities or CPD.

This finding contributes to research into teachers' CPD. In our Dutch sample, most teachers claimed fairly regular participation in CPD, in combination with a high student orientation, but the low CPD profile, which is also the least student oriented, still represents about one-quarter (24%) of all teachers. This substantial group may be critical to efforts to improve the quality of Dutch education, because

today's teachers need, in addition to regular participation in CPD, to serve as knowledge experts, competent deliverers of knowledge, and facilitators and activators of students' own learning processes (European Commission, 2010; Verloop, 2003).

With regard to their participation in separate CPD activities, the teachers in our study showed significantly more participation in updating and collaborative activities than in reflective activities, in line with previous research (Dijkstra, 2009; Kwakman, 2003; Van Eekelen, 2005). The explanation for this finding might involve the nature of reflection, which is likely to force the person to engage in an uncomfortable consideration of her or his shortcomings and anomalies (Korthagen, 2012), possibly making teachers hesitant to engage in reflective activities (Runhaar et al., 2010; Schön, 1983).

Regarding the background variables, our findings pertaining to gender accorded with those in previous research (De Brabander et al., 2011; OECD, 2009; Runhaar et al., 2010). Female teachers participated significantly more in CPD in general, as well as in each CPD activity, compared with male teachers. In the high CPD profile, twice as many female teachers appeared as male teachers, whereas the low CPD profile showed the opposite pattern. The explanation for this finding could reflect differences in the goals of female teachers (teaching) and male teachers (careers), which may influence their participation in CPD, focused primarily on improving teaching skills and teacher quality (Scott, 2002). Regarding CPD profiles and years of experience, though teachers differ in their professional development behavior and needs at each stage of their career (Day & Sachs, 2004; Huberman, 1992), contrary to findings by Richter et al. (2011), we found no differences across the CPD profiles. Only one significant trend, as suggested in previous research (Van Woerkom et al., 2002; Grangeat & Gray, 2007), emerged in relation to reflective activities: With more years of experience, teachers participate less in reflective activities. However, this very small trend did not seem to necessitate further in-depth investigation.

### 5.4.1 Further research

Some limitations of this study also suggest directions for further research. First, the study sample consists of only four secondary schools with a response rate of 25%, and the schools are all located in one country, the Netherlands, that has adopted a national CPD policy in which teachers have the professional autonomy to determine whether to take part in CPD. Replications of this study with more participants and in an international context could help investigate whether the role of beliefs about learning and teaching is comparable across countries with different CPD policies. For example, the United Kingdom and Unites States offer interesting

study contexts, because both countries recently have undergone large-scale, top-down educational reforms, and debates about managerialism and control are pervasive, in both initial teacher education and CPD discussions (Burns, 2005; Zeichner & Ndimande, 2008).

Second, we have made an assumption about teachers' CPD and student orientations, namely, that continuously developing and student-oriented teachers are better than colleagues that engage in little or no development and are not student oriented. But are the former really better teachers, with more effective practices in the classroom and higher students' learning outcomes, than medium or low CPD or less student-oriented teachers? It would be interesting to explore how these differences become manifest in the classroom instructional approaches adopted by the different types of teachers. Furthermore, we do not know for certain that teachers' beliefs about learning and teaching are consistent with their practices. Beliefs and practices have complex relationships and are not always congruent (Bolhuis, 2000; Boulton-Lewis et al., 2001; Calderhead, 1996; Fang, 1996). In an OECD study of the Netherlands for example (Van Cooten & Van Bergen, 2009), teachers indicated student-oriented beliefs, but their reported teaching practices more often reflected subject matter orientations.

Third, we note a methodological issue regarding the use of self-reports to measure teachers' own CPD and beliefs. Although person-bound factors likely can be well assessed by the teachers themselves, to gain insight into teachers' actions and perceptions, the use of more data sources, such as classroom observations, interviews, and reflective writings, would benefit further research (Borko & Putnam, 1996; Kagan, 1990).

Fourth, we describe some interventions that may enhance teachers' CPD and student orientation in the next section. These interventions have been proven successful, yet we also call for more longitudinal research that seeks to determine if they really enable sustained change (Evans & Kozhevnikova, 2011). The context in which teachers work could enhance or inhibit their professional development; individual differences other than beliefs about learning and teaching should be taken into account too. For example, researchers might examine teachers' epistemological beliefs: Do teachers regard knowledge as something absolute or unchanging, such that they are unlikely to accept conflicting evidence, or do they believe that knowledge is tentative and changing (Schommer, 1998)? Because beliefs, practices, and change—as well as other individual and contextual variables—collectively influence teachers' CPD, we hope further research develops multidimensional models to clarify all the processes at work and ultimately enhance both learning and teaching (Evans & Kozhevnikova, 2011).

### 5.4.2 Practical implications

Despite these limitations, the findings of this study have some key implications. In particular, the CPD profiles we revealed and their relationships with student-oriented beliefs represent important findings from the perspective of improving teacher quality and the quality of student learning, at least in a Dutch setting. The main question that remains is how to foster teachers' participation in CPD, in combination with their student orientation, in a situation marked by professional autonomy and with a careful consideration of belief characteristics. First, as collaborative CPD literature notes (Cordingley, Bell, Evans, & Firth, 2005a), collaboration with colleagues provides a tool for teachers to develop ownership and personalize their learning; initial cooperation ultimately may transform into genuine collaboration. Second, another catalyst of ongoing learning by teachers may come from student impact data. Teachers should be encouraged to articulate, record, and reflect on their perceptions about the impact of their CPD and related changes in classroom practices on their students' learning. Third, such a reflection on perceptions should occur in combination with a close examination of beliefs (Borko & Putnam, 1996; Clarke & Hollingsworth, 2002; Gow & Kember, 1993; Guskey, 2002; Richardson, 1998). According to teacher change theories (Clarke & Hollingsworth, 2002; Desimone, 2009; Guskey, 2002), teachers reflect on both their teaching practices and their beliefs (Richardson, 1998). Because beliefs tend to be implicit, teachers need to develop a language for talking and thinking about their own practices (Freeman, 1991). They also need support to make their beliefs explicit, such as through opportunities to confront the potential inadequacy of their beliefs and the provision of new information that they can examine, elaborate on, and integrate into their existing systems of knowledge and beliefs (Borko & Putnam, 1996; Donaghue, 2003; Brown, 1990). Such an examination and, if necessary, adjustment of beliefs should begin in initial teacher education (Brownlee, 2004; Richardson, 2003; Tillema, 2000). By combining these three tactics, policy makers and schools could better encourage teachers' participation in CPD and student orientation.

Applying these characteristics to concrete CPD activities, we propose that suitable CPD activities for (prospective) teachers include learning studies (Lo, Pong, & Chik, 2005) and collaborative action research projects (Cordingley et al., 2005a; De Vries, Beijaard, & Buitink, 2008; Ponte, 2002b; Timperley & Earl, 2012). In learning studies, a group of teachers observes live classrooms and collects data on teaching and learning, which they collaboratively analyze in an effort to improve students' ability to learn specific objects, as well as facilitate teachers' collaborative learning in authentic situations (Lewis, Perry, & Murata, 2006). In action research projects (De Vries et al., 2008), experienced and student teachers work closely together,

experimenting with and reflecting on new educational practices that reflect teaching and learning issues selected by the experienced teachers.

A good context for enhancing (prospective) teachers' CPD and student orientation may be a school organized as a learning environment for students but also as a learning environment or professional learning community (Stoll et al., 2006), focused widely on student learning, shared values and vision, collective responsibility, reflective professional inquiry, collaboration, group and individual learning, and sufficient time and support for teachers (Little, 2006; Richardson, 1998; Stoll et al., 2006). Various review articles, such as those by Waslander (2007), Van Veen et al. (2010), Vescio, Ross, and Adams (2008), and Lomos, Hofman, and Bosker (2011), all concur. The latter researchers also find small, positive effects on students' learning outcomes.

In contexts marked by educational change, the same characteristics play crucial roles. Orafi and Borg (2009) find that the uptake of an educational innovation is limited if it is not congruent with teachers' beliefs about learning and teaching. Therefore, before launching any reform project, the likely discrepancies between teachers' beliefs and the ideas underpinning curriculum innovations must be identified, analyzed, and addressed (Handal & Herrington, 2003; Lamb, 1995; Van Driel et al., 2001). For CPD activities in those contexts, long-term activities should combine collaboration and reflection, such as learning in networks, peer coaching, collaborative action research, and the use of cases (Van Driel et al., 2001).

Finally, because teachers are perhaps the most crucial actors in education settings, questions about whether their CPD increases their quality and the quality of their schools and student learning, how teachers differ in their CPD, the crucial role of teachers' beliefs about learning and teaching (in particular, the role of a student orientation for teaching practices), and how to improve teachers' CPD and student orientation are all of great importance. This knowledge is essential not just for the teachers themselves but also for educational administrators, policy makers, and the public at large. To provide high-quality education to all students, encouraging the CPD of teachers and their student orientations should be national priorities worldwide (Zeichner & Ndimande, 2008).

# Chapter 6
# Student teachers' participation in learning activities and their effective teaching behavior

*The study in this chapter explores the extent to which student teachers participate in the three learning activities important for career-long learning and whether they can be grouped according to their level of reported participation in learning activities. Then, the relationship between their participation in learning activities and their observed effective teaching behavior is investigated. The results indicate that student teachers vary in their self-reported learning, and that they participate significantly more frequently in reflective activities than in updating and collaborative activities. Two student teacher learning profiles were identified, reflecting relatively low and relatively high participation in the three learning activities. Student teachers belonging to the latter profile proved to be significantly more effective teachers than student teachers belonging to the former profile.*

This chapter is based on:

De Vries, S., Jansen, E.P.W.A., Helms-Lorenz, M., & Van de Grift, W.J.C.M. Student teachers' participation in learning activities and their effective teaching behavior. Submitted for publication.

## 6.1 Introduction

Teacher learning offers an important means to increase teacher quality and improve the quality of teaching practices and student learning, which makes it an essential and integral part of the teaching profession (Beijaard, Korthagen, & Verloop, 2007; Day, 1999; Feiman-Nemser, 2001; Verloop, 2003). Teacher learning entails a self-directed, active, career-long process, during which teachers engage in various formal and informal learning activities, on and off the job, in line with teachers' professional goals to adjust their knowledge and beliefs and/or teaching practices (Bakkenes, Vermunt, & Wubbels, 2010; Beijaard, 2009; Feiman-Nemser, 2001; Webster-Wright, 2009). Specific important learning activities for teachers are the development and updating of knowledge and skills, reflection on teaching experiences and collaboration with colleagues (Schraw, 1998; Timperley, Wilson, Barrar, & Fung, 2007; Verloop, 2003).

Over the last twenty years, teacher learning has been increasingly viewed as a continuum (Feiman-Nemser, 2001), which is typically referred to as the 3 Is: from initial teacher education (year 1), via induction (years 2 and 3) to in-service learning during the remaining years of the teaching career (Conway, Murphy, Rath, & Hall, 2009). Though teachers' tasks, roles and learning needs will differ at different stages in their learning to teach over time, these phases are related, and threads of continuity, among other things, form the learning activities of development and updating, reflection and collaboration (Buitink & Beijaard, 2007; Feiman-Nemser, 2001).

The first, relatively short stage of the learning continuum is often seen as crucial, because most influential for student teachers' further professional development (Conway et al., 2009; Endedijk, Vermunt, Verloop, & Brekelmans, 2012). During initial teacher education student teachers are likely to determine whether they engage in learning, and they develop their personalized pattern of teacher learning (Buitink & Beijaard, 2007; Eraut, 1994; Hammerness et al., 2005). Therefore, student teachers who in initial education engage in learning activities are more likely to pursue these activities in the next stages of the learning to teach continuum, and consequently to become and stay a career-long learning teacher.

In the Netherlands, however, certainly not all teachers are career-long learning professionals. In a situation where in-service learning is an optional professional duty (Scheerens, 2010), experienced Dutch teachers turn out to vary widely in the extent to which they participate in learning activities (Bakkenes, Vermunt, & Wubbels, 2010; De Vries, Van de Grift & Jansen, 2013a, Chapter 3; Diepstraten, Wassink, Stijnen, Martens, & Claessen, 2011; Vogels, 2009). In particular and compared with updating knowledge and skills and collaboration with colleagues,

experienced teachers seem to engage relatively less in reflective activities (De Vries et al., 2013a; Dijkstra, 2009; Kwakman, 2003; Van Eekelen, 2005). Furthermore, different teacher profiles seem to exist, reflecting different levels of participation in the three learning activities across teachers (De Vries, Jansen & Van de Grift, 2013b, Chapter 5).This study addresses this tendency specifically among Dutch student teachers, and aims to determine the extent to which they develop their knowledge and skills, reflect on their own teaching experiences and collaborate with colleagues, and with it lay a foundation for the rest of their working life. Although student teacher learning has been the subject of several studies (Endedijk et al., 2012; Hagger, Burn, Mutton, & Brindley, 2008; Mansvelder-Longayroux, Beijaard, & Verloop, 2007; Oosterheert & Vermunt, 2001), no studies specifically address student teachers' participation in career-long learning activities. Accordingly, the first goal of this exploratory study is to identify student teachers' actual participation in learning activities important for career-long learning.

The importance of teacher learning surely is the connection with improvement of teaching practices, teacher quality and the quality of student learning. For experienced teachers, there is a growing body of research consensus on the main features of teacher learning associated with improved teaching practices and learning outcomes for students (e.g., Bransford, Brown, & Cocking, 2000; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Desimone, 2011; Timperley et al., 2007; Van Veen, Zwart, Meirink, & Verloop, 2010), yet no research considers whether this relationship between learning and teaching practice differs for student teachers. Therefore, the second goal of this exploratory study is to obtain information about student teachers' participation in learning activities in relation to their teaching behaviors.

A good understanding of student teachers' participation in learning activities and its relation to their teaching behaviors will give us insight into this crucial, brief, initial teaching stage, during which teachers should establish a pattern of active career-long learning to develop and refine their teaching practices over time (Endedijk et al., 2012; Eraut, 1994; Hammerness et al., 2005).

### 6.1.1 Teacher learning

Starting in the 1980s, largely due to changing economic, social and educational developments around the world, teachers began to be expected to learn over the course of their careers (Beijaard, Korthagen, & Verloop, 2007; Hargreaves, 2000). Before then, the dominating view was that of an autonomous, teaching-oriented professional who takes his own decisions about both the curriculum, teaching, learning, assessment and the own professional development. Teachers then had the choice of being a 'restricted' or 'extended' professional (Hoyle, 1980) (restricted

professionality indicates thought and practice which is largely intuitive and classroom based, while extended professionality takes account of a broader educational context and a wider range of professional activities). By contrast, the contemporary teacher is expected to be a learning-oriented, 'adaptive expert', who is able to teach increasingly diverse learners, knowledgeable about new understandings and conceptualisations of learning, knowledge, curriculum and assessment, and is competent in complex core academic content and skilful in the craft of teaching (Vermunt & Verloop, 1999; Darling-Hammond et al., 2009). The knowledge, skills and attitudes needed for this complex teaching profession cannot be developed fully in pre-service education programs (Feiman-Nemser, 2001; Hammerness et al., 2005), so career-long learning is expected of all teaching professionals (Day & Sachs, 2004).

Research on teacher learning identified several characteristics of teacher learning associated with improved teacher quality and student learning outcomes (e.g., Bransford, Brown, & Cocking, 2000; Darling-Hammond et al., 2009; Desimone, 2011; Timperley et al., 2007; Van Veen et al., 2010). More general principles are that the learning should be sustained and coherent with the needs, concerns and interests of individual teachers as well as of the school, and supported by organizational conditions, such as leadership and a learning culture at the school level. At the teacher level, learning should focus on content and instruction involving applicable content and pedagogy, and should be related directly to student learning and learning outcomes. Specific characteristics of teacher learning activities are active and inquiry-based (e.g., observing and receiving feedback, analysing student work), together with collaborative and collegial (e.g., sharing problems, setting common goals, instructional planning). These characteristics correspond with important adult learning principles such as reflecting on practical experiences and interacting and collaborating with others (Bolhuis, 2004, 2009; Eraut, 1994; Gravani, 2012; Merriam, 2008). To these key principles for adult learning, Bolhuis (2004, 2009) and Eraut (1994) added reading publications and studying theory. We therefore consider developing and updating knowledge and skills, reflecting on experiences and collaborating with colleagues as important career-long learning activities for the whole spectrum of teacher learning, not only for teachers in the induction and in-service phases, but also for student teachers in initial teacher education.

Initial teacher education in the Netherlands, as in many other countries, is provided by school-based teacher education programs, increasingly organized as partnerships between colleges/universities and schools (Conway et al., 2009; OECD, 2005). This applies to the role of schools in hosting teaching practice with

an experienced teacher as mentor of the student teachers. Student teachers work (and are sometimes paid) as teachers in schools and continue their learning activities both in the schools and in their teacher education institute. The sources for learning thus are diverse, including not just theory and literature offered through the institute but also their own experiences during practice teaching at the school and interactions with a mentor, a school-based teacher educator and other colleagues at the practice school (Buitink & Beijaard, 2007; Feiman-Nemser, 2001). The three key learning activities (developing and updating knowledge and skills, reflecting on teaching experiences and collaborating with colleagues) are integral to school-based teacher education (Bolhuis, 2004; Buitink & Beijaard, 2007; Feiman-Nemser, 2001).

Firstly, with regard to the development of knowledge and skills, student teachers need to develop a practical and theoretical knowledge base in the subject matter they teach, along with general pedagogical knowledge and pedagogical content knowledge (Verloop, Van Driel, & Meijer, 2001). Student teachers' practical knowledge, which often is implicit (Zanting, Verloop, & Vermunt, 2001), expands through experience and teaching practice. The development of their theoretical knowledge base also requires intentional activities, which in turn are conducive to other professional activities; for example, a sufficient theoretical knowledge base is necessary for meaningful reflection (Hagger & McIntyre, 2006; Korthagen & Buitink, 2010; Verloop, 2001) and supports collaboration (Cheetham & Chivers, 2001). We therefore consider reading (e.g., professional literature, manuals of textbooks, educational websites) and schooling (e.g., courses and training sessions in or outside the practice school and teacher education institute) as tactics for developing their knowledge and skills.

Secondly, reflective activities pertain to professional tasks that require a specialized form of thinking to confront and clarify a puzzling or curious situation (Dewey, 1933). Schön (1983) refers to such activities as reflection-on-action, because they entail a deliberate process to reconsider existing (implicit) knowledge, beliefs, possibilities, ideas and actions. In contrast, reflection-in-action implies a subconscious process that experts refine on the basis of their learning through experience, which initially may be difficult for student teachers (Korthagen & Buitink, 2010). Reflection is a critical professional activity (Eraut, 1994; Schön, 1983) that helps student teachers 'see differently' and reframe a situation (Schön, 1983), such that they might gain insights into how to better understand the situation and act on it (Korthagen, Loughran, & Russell, 2006). The importance and value of reflection are such that it has been adopted as a foundation for many teacher education programs (Loughran, 2002). In this study, we focus on reflection-on-

action, which is possible either individually (e.g., analysing samples of students work, examining problems, observing the impact of instruction on students) or with colleagues and students, and which can include practical research, individually or in collaboration (Kallenberg, Koster, Onstenk, & Scheepsma, 2007; Ponte, 2002b).

Thirdly, collaborative activities are also essential for learning to teach; they take place both in the practice school with experienced teachers as colleagues, and the teaching institute with peers (Korthagen et al., 2006). Collaborative learning with colleagues within and across schools is a highly effective form of learning (Bakkenes, Vermunt, & Wubbels, 2010; Clement & Vandenberghe, 2000) that also leads to improvements in both teaching and learning (Cordingley, Bell, Thomason, & Firth, 2005a; Westheimer, 2008). We distinguish two collaborative activities by student teachers (OECD, 2009): exchange activities (e.g., discussing problems, exchanging instructional materials) and professional collaboration (e.g., developing educational materials, team teaching).

In summary, student teachers in school-based teacher education should take the initiative and actively pursue learning processes, thereby setting a foundation for their career-long learning (Buitink & Beijaard, 2007) by participating in all three types of learning activities. We include, therefore, all three activities as manifest factors of the latent construct of student teachers' learning in our theoretical model (Figure 1). However, just like experienced teachers, student teachers presumably vary in the extent to which they participate in each learning activity. To identify and specify differences in participation, for experienced teachers different teacher profiles were found, reflecting different levels of participation in the three learning activities (De Vries et al., 2013b). For student teachers, some relevant attempts to define student teacher types include Oosterheert, Vermunt, and Denessen (2002), who cite four orientations or patterns toward learning to teach: 'survival', 'closed reproduction', 'closed meaning', and 'open meaning', such that the former are barely engaged in learning, whereas the latter use all available sources to understand learning and teaching. Hagger et al. (2008) focus on learning from experience, comparable with 'reflection on teaching experiences', and find some student teachers whose orientation towards the process of learning from experience meant that the experience could be seen as 'miseducative', and some student teachers who were happy to cast themselves in the role of learners. The latter orientation and the 'open meaning' orientation toward learning often are considered the most preferable orientations toward learning to teach, and regarded as essential in being prepared for further professional development (Haggert et al., 2008; Oosterheert, Vermunt, & Denessen, 2002). However, these studies pertain to

the specific nature of student teacher learning or to only one learning activity (reflection on teaching experiences), and do not specifically address student teachers' participation in several career-long learning activities. With this study, we seek the profiles of student teachers reflecting their participation in the three learning activities important for career-long learning.

### 6.1.2 Effective teaching

In the complex activity of teaching, at least three dimensions can be distinguished: the teacher as instructional manager, as caring and moral person and as generous expert learner (Seifert, 1999). The first notion of teacher as instructional manager is most visible and has received much attention. For example, in the past forty years it was the focus of much of the research of teacher effectiveness (e.g., Brophy & Good, 1986). In this strand of research, effective teaching equals successful teaching insomuch as identifiable and observable teacher behaviors lead to enhanced student achievement. However, effective teaching and good teaching should not be confused with one another (Fenstermacher & Richardson, 2005). Effective teaching should imply that students have learnt, whereas good teaching should involve morally defensible and rationally sound principles of instructional practice. Furthermore, Fenstermacher and Richardson (2005) argue that whether teaching is effective and good is not located solely in the teacher as individual, but should be conjoined with contextual factors, such as student motivation and supportive social environment. Against this background, in this study we focus on the observable, effective behaviors of the teacher as an instructional manager.

For this instructional dimension of the teaching practice, consistently replicated findings from the teacher effectiveness research tradition confirm the importance of teachers' behaviors (e.g., Hattie, 2009; Marzano, 2008; Scheerens & Bosker, 1997; Seidel & Shavelson, 2007; Wayne & Youngs, 2003), and link student achievement to a business-like and supportive classroom climate, effective classroom management, the provision of structured and clear information, the quantity and pacing of instruction, student activation by asking questions and small group tasks, the provision of feedback and adaptive teaching (Creemers & Kyriakides, 2012). To evaluate teaching effectiveness, usually teachers' performances in classrooms are assessed by means of observations. Although observations have some disadvantages, in that these observations are snapshots and undoubtedly influence the teacher's behavior (the 'observer effect'), they offer the promise of objectivity by the outside observers, who are likely to be trained and experienced with observing classrooms and teachers, to enable them to judge behaviors relative to the behaviors of other teachers (Muijs, 2006). Multiple observation instruments also exist to assess the quality of teaching behaviors (e.g., Kyriakides, Creemers, &

Antoniou, 2009; Stronge, Ward, & Grant, 2007; Van de Grift, 2007). Van de Grift's (2007) observation instrument features six standards and indicators, including 'a safe and stimulating environment' (SAFE), 'efficient lesson organization' (EFFICIENT), 'clear and structured instruction' (CLEAR), 'intensifying the lesson and activating students' (ACTIVATING), 'adapting instruction to student differences' (ADAPTING) and 'teaching students thinking and learning strategies' (STRATEGIES).

Research into these teaching behaviors showed that almost all teachers with at least 15 years of teaching experience can perform the first three teaching behaviors, but not all teachers succeed in performing the last three (Van de Grift, 2010). According to a cross-sectional study of the long-term development of teaching skills in German primary education, specifically student teachers are generally still far from the performance levels attained by a teacher with average experience. Student teachers seem able to perform the SAFE and EFFICIENT teaching behaviors in a satisfactory manner, but they cannot yet perform CLEAR effectively, and they seem unable to achieve ACTIVATING, ADAPTING and STRATEGIES (Van de Grift, Van der Wal, & Torenbeek, 2011). These findings are consistent with research into the level of difficulty of different teaching behaviors. Van de Grift et al. (2011) showed that activities in the SAFE and EFFICIENT domains reflect easy competences, whereas the CLEAR and ACTIVATING domains create intermediate difficulty, and ADAPTING and STRATEGIES are the most difficult. These findings are congruent with teacher development theories (Berliner, 1994, 2001; Fuller & Bown, 1975; Huberman, 1989) that describe beginning teachers as focusing more on their own position, classroom management, and subject matter content knowledge rather than on students' needs and learning processes.

In this study, we focus on initial teacher education for secondary schools and explore the levels of student teachers' performance, to relate these behaviors to their participation in learning activities. For a more complete picture, we include all six effective teaching behaviors as manifest factors of the latent construct of student teachers' effective teaching behavior in our theoretical model (Figure 1).

### 6.1.3 The aim of this study

This study considers student teachers' participation in activities important for career-long learning and the relationship between student teachers' learning and their teaching behavior. In the Netherlands, initial teacher education is school-based, and the three groups of learning activities (developing and updating knowledge and skills, reflecting on teaching experiences and collaborating with colleagues) are integrated in school-based teacher education programs (Bolhuis, 2004; Buitink & Beijaard, 2007; Feiman-Nemser, 2001), which makes them available

for all student teachers. However, several studies on the specific nature of student teacher learning found individual differences in learning to teach between student teachers: different orientations to learning associated with the quality of individual learning (Haggert et al., 2008; Oosterheert & Vermunt, 2001), as well as differences in the regulation of their learning: Most student teachers reduced their self-regulation efforts over the course of their programs, such that only one-third of the student teachers at the end of a one-year post-graduate teacher education program exhibited self-directed and active learning tactics (Endedijk et al., 2012). For participation in career-long learning activities, it thus seems plausible to expect that student teachers tend to vary in their participation. We also assume that student teacher profiles could be identified to reveal and specify existing differences in participation across student teachers.

For the relationship between student teachers' learning and effective teaching behavior, we could glean insights from studies on adult learning and on effective learning for experienced teachers, and assume some congruity between experienced teachers and student teachers. Accordingly, the more a student teacher participates in learning activities, the more effective his or her teaching behavior could be. On the other hand, student teachers' teaching behavior is in such an early stage that the question arises whether an eventual better teaching behavior will be visible anyway. The relationship between student teachers' participation in learning activities and effective teaching behavior thus remains to be explored, both in general and more specific on the basis of student teacher profiles, which leads us to the following research questions (RQ) of this study:

1 How do student teachers describe their participation in the three learning activities important for career-long learning (development of knowledge and skills, reflection on experiences and collaboration with colleagues)?
2 What patterns are discernible in student teachers' participation in the three career-long learning activities?
3 What is the relation between student teachers' participation in learning activities and their observed level of effective teaching behavior?
4 What is the relation between the student teacher profiles reflecting the level of participation in the three learning activities and the observed levels of effective teaching behavior?

RQ 3 also appears in our theoretical model, which we use to depict the relationship between learning and effective teaching behavior (Figure 1).

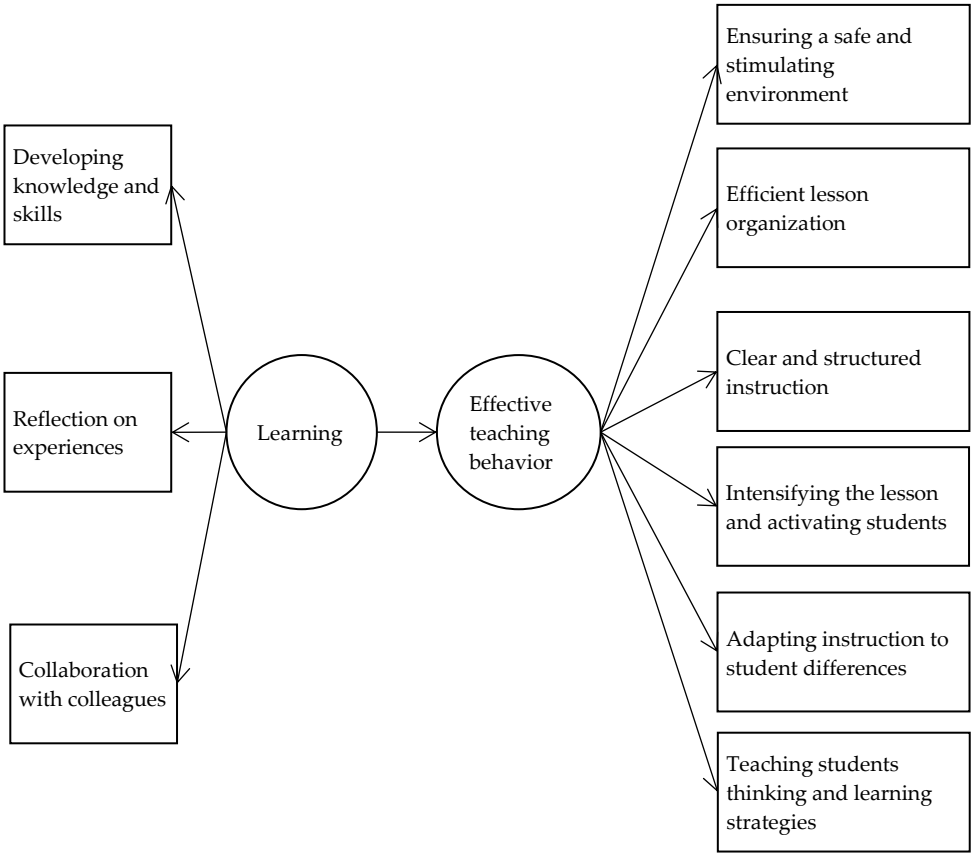



***Fig. 1**. Theoretical model of learning and effective teaching behaviors*

## 6.2 Method

### 6.2.1 Participants

This research is part of a national, longitudinal research project, 'Effects of educating teachers at school', funded by The Netherlands Organization for Scientific Research (NWO, project number 411-09-802). The project seeks to compare teacher preparation routes for primary education, secondary education and technical and vocational training to determine their effects on teacher effectiveness and retention. All schools in the Netherlands were approached to participate, and student teachers participated voluntarily. Among secondary education schools, the total sample featured 297 student teachers, 67 of whom agreed to complete the learning survey and be observed, in 27 schools spread

across the country. This response rate (23%) is average (Sheehan, 2001). We provide descriptions of the final sample of 67 student teachers in Table 1.

***Table 1***
*Sample description (N = 67)*

| | |
|---|---|
| Gender | Men: 46%<br>Women: 54% |
| Age | $M_{age}$ = 26.4 years (SD = 7; range 20–56 years) |
| Years of experience | $M_{teaching\ experience}$ = 1 year (SD = .8; range 0–3 years) |
| Subject matter taught | Languages: 28%<br>Sciences: 31%<br>Social studies: 37% |
| Qualification | Master program for a grade-one qualification (i.e., qualification to teach all forms of secondary education): 43%<br>Bachelor program for a grade-two qualification (i.e., qualification to teach junior forms of secondary education): 53% |

Notes: The percentages in the table do not add up to 100% because there were some missing cases (i.e., student teachers who did not respond to all items).

### 6.2.2 Instrumentation

To measure student teachers' *learning activities*, we relied on items from a study of teachers' learning (De Vries et al., 2013a). The items related to developing knowledge and skills (11 items; e.g., 'I read professional journals'), reflecting (13 items; e.g., 'I ask students to fill out surveys for feedback on my lessons') and collaborating (16 items; e.g., 'I share learning experiences with colleagues') appeared as three separate sets, all measured on four-point Likert scales (1 = never, 2 = rarely, 3 = regularly, 4 = very often). Reliability analyses of the respective sets indicated that all three scales were reliable (developing Cronbach's $\alpha$ = .77; reflective Cronbach's $\alpha$ = .75; collaborative Cronbach's $\alpha$ = .83).

We also used the *observation instrument* originally developed for the International Comparative Analysis of Learning and Teaching (ICALT) project (Van de Grift, 2007). Although developed for primary education settings, this measure is suitable for observing teachers' behaviors in secondary education (Canrinus, 2011). The observation instrument consists of 32 items related to the six teaching behaviors: SAFE (4 items; e.g., 'The teacher ensures a relaxed atmosphere'), EFFICIENT (4 items; e.g., 'The teacher ensures the orderly progression of the lesson'), CLEAR (7 items; e.g., 'The teacher gives clear instructions and explanations'), ACTIVATING (7 items; e.g., 'The teacher makes use of teaching methods that activate the pupils'), ADAPTING (4 items; e.g., 'The teacher adapts the instruction to the relevant differences between pupils') and STRATEGIES (6 items; e.g., 'The teacher

stimulates the use of control strategies'). Every item is complemented by several examples of good practices, to help all the observers focus on the same practices. The items were scored on a four-point Likert scale (1 = predominantly weak, 2 = more weaknesses than strengths, 3 = more strengths than weaknesses, and 4 = predominantly strong). The reliability analyses indicated that all six scales achieved good reliability (SAFE Cronbach's $\alpha$ = .81; EFFICIENT Cronbach's $\alpha$ = .84; CLEAR Cronbach's $\alpha$ = .87; ACTIVATING Cronbach's $\alpha$ = .81; ADAPTING Cronbach's $\alpha$ = .77; STRATEGIES Cronbach's $\alpha$ = .88). In each participating school, the trained observers observed the student teachers during their teaching activities. One observer visited each participating student teacher's classroom to observe for one hour. The observers' training took place in sessions of 5–12 participants each, and the trainers were lecturers in the department of teacher education. The head of the department participated in developing and executing these training sessions, in which the observers received background information about the items, as well as information about effective teacher behaviors. The sessions also included reviews of the scoring procedure, which the trainees practised using by scoring a video fragment of a teacher conducting a 15-minute lesson. After the participants revealed their judgments, they discussed any differences and similarities and defended their scores, with the aim of reaching consensus. A second video fragment followed, with the same procedure. The resulting forms revealed the inter-rater reliability levels, and any observers who attained less than 70% consensus did not participate in the research.

### 6.2.3 Data analysis procedures

We began by computing the mean scores, standard deviations, minimum and maximum scores and paired sample *t*-tests to assess student teachers' participation in the three learning activities (RQ1). To investigate the occurrence of different student teacher profiles (RQ2), we followed a cluster analysis technique, in which we created subgroups (i.e., profiles) of relatively homogeneous cases, using the scores on the three activities scales. Independent sample *t*-tests served to assess the differences between the three activities for each learning profile. Then, to determine the link between these activities and effective teaching behaviors (RQ3), we computed the mean scores and standard deviations for student teachers' effective teaching behaviors, as well as the correlations for all nine variables (i.e., three professional activities and six teaching behaviors), to inform our structural equation model (SEM), implemented in LISREL 8.8 (Jöreskog & Sörbom, 2007). The two measurement models involve the relationships of the three learning activities (indicators) with the learning construct (latent variable), and the relationships of the six teaching behaviors (indicators) with the effective teaching behavior

construct (latent variable). To test the structural model, we considered the relationship of the learning construct (exogenous variable) with the effective teaching behavior construct (endogenous variable). We used several indices to evaluate the fit of our model, all of which are relatively insensitive to sample sizes (Hooper, Coughlan, & Mullen, 2008). To investigate the relationship between the student teacher profiles and effective teaching behaviors (RQ4), we conducted independent sample *t*-tests.

## 6.3 Results

### 6.3.1 Student teachers' learning activities

We standardized all the scale scores; in Table 2, we provide the mean scores, standard deviations, and the minimum and maximum scores for the three learning activities. In their learning, student teachers participate rarely to regularly in developing and collaborating activities, whereas they participate more regularly in reflective activities. That is, their participation in reflective activities (M = .71) was significantly higher than their participation in developing activities ($M$ = .66; $t(66)$= 3.48, $p$ = .001, $r$ = .16) or collaborative activities ($M$ = .65; $t(66)$= 4.55, $p$ < .001, $r$ = .26), though the effect sizes were rather weak. The standard deviations and differences between the minimum and maximum scores indicated that student teachers also varied in the extent to which they participated in learning activities, in support of our expectation.

***Table 2***

*Mean standardized scores, standard deviations, and minimum and maximum scores for student teachers' learning activities (N = 67)*

| *Scale* | *M* | *SD* | *Min.* | *Max.* |
|---|---|---|---|---|
| Developing knowledge and skills | .66 | .11 | .41 | .98 |
| Reflection on experiences | .71 | .07 | .54 | .90 |
| Collaboration with colleagues | .65 | .09 | .45 | .91 |

### 6.3.2 Student teacher profiles

We ran the cluster analysis on the scores of the three learning activity scales for all 67 cases. A hierarchical cluster analysis using Ward's method served to provide some sense of the possible number of clusters, and two clusters emerged from the dendogram. By re-running the clustering with the k-means method, we iteratively estimated the cluster means and assigned each case to the cluster for which its distance from the cluster mean was the smallest. Thus, two profiles were created,

each containing relatively homogeneous cases. Table 3 presents the mean scores of the learning activity scales of both clusters. Independent sample *t*-tests showed that the clusters differed significantly from each other on the developing scale ($t(65) = 8.52$, $p < .000$), the reflection scale ($t(65) = 2.81$, $p > .01$), and the collaboration scale ($t(65) = 6.33$, $p < .000$ )

***Table 3***
*Means for the three learning activities per cluster (N = 67).*

| | *Cluster 1 'High participation profile' (n = 43)* | *Cluster 2 'Low participation profile' (n = 24)* |
|---|---|---|
| Developing knowledge and skills | .72 | .56 |
| Reflection on experiences | .73 | .68 |
| Collaboration with colleagues | .70 | .58 |

The scores for the clusters in Table 3 allow us to typify two types of student teachers who differ in their participation in career-long learning activities, referring to their relative positions on the three scales. The first cluster (Cluster 1 = 64%) was characterised by relatively high (close to regular) participation in career-long learning activities (High Participation, HP-profile). The second cluster (Cluster 2 = 36%) was characterised by relatively low (mainly close to rare) participation in the three learning activities (Low Participation, LP-profile). Parallel to experienced teachers, student teacher profiles were identified, also in support of our expectation.

### 6.3.3 Learning and effective teaching behavior

To test the link between learning and effective teaching behavior, we computed the mean scores, standard deviations and the minimum and maximum scores for student teachers' effective teaching behaviors (Table 4). On average, the observers noted that student teachers engaged strongly in the first three teaching behaviors ($M_{SAFE} = .79$, $M_{EFFICIENT} = .75$, $M_{CLEAR} = .72$). Their scores on ACTIVATING behaviors ($M = .68$) were close to the more strengths than weaknesses category. In contrast, student teachers performed weakly rather than strongly with regard to the last two behaviors ($M_{ADAPTING} = .52$, $M_{STRATEGIES} = .59$). The standard deviations and differences between the minimum and maximum scores indicated that student teachers also varied in the extent to which they behaved effectively in their teaching.

***Table 4***

*Mean standardized scores and standard deviations for student teachers' effective teaching behaviors (N = 67).*

| *Scale* | *M* | *SD* | *Min.* | *Max.* |
|---|---|---|---|---|
| Ensuring a safe and stimulating environment | .79 | .14 | .38 | 1 |
| Efficient lesson organization | .75 | .18 | .31 | 1 |
| Clear and structured instruction | .72 | .16 | .36 | 1 |
| Intensifying the lesson and activating students | .68 | .17 | .25 | 1 |
| Adapting instruction to student differences | .52 | .18 | .25 | 1 |
| Teaching students thinking and learning strategies | .59 | .21 | .25 | 1 |

The Pearson correlation coefficients that we derived from computing the intercorrelations of all nine variables (Table 5) indicated moderate correlations between developing and reflective activities ($r$ = .27), and between collaborative and reflective activities ($r$ = .30). Developing and collaborative activities correlated more strongly ($r$ = .48). Although we thus found some overlap among learning activities, the scales measured distinct aspects. The high inter-scale correlations also offered preliminary support for a one-dimensional construct of learning. The mean inter-scale correlations for effective teaching behaviors ranged from .44 (EFFICIENT–ADAPTING) to .85 (CLEAR–ACTIVATING). That is, the teaching components overlapped somewhat, but the scales measured distinct aspects of teaching behavior. These high inter-scale correlations also suggested preliminary support for the one-dimensional construct of teaching behavior. Furthermore, high correlations between components of learning and components of teaching behavior provided strong preliminary support for a potential link between learning and effective teaching behavior. Thus, it appeared reasonable to perform the next step, namely, SEM analysis.

***Table 5***
*Intercorrelations among model variables (listwise, N = 67)*

| | | *1.* | *2.* | *3.* | *4.* | *5.* | *6.* | *7.* | *8.* | *9.* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Developing knowledge and skills | 1 | | | | | | | | |
| 2. | Reflection on experiences | .27* | 1 | | | | | | | |
| 3. | Collaboration with colleagues | .48** | .30* | 1 | | | | | | |
| 4. | Ensuring a safe and stimulating environment | 13 | .10 | .29* | 1 | | | | | |
| 5. | Efficient lesson organization | .34** | -.01 | .36** | .69** | 1 | | | | |
| 6. | Clear and structured instruction | .36** | .11 | .34** | .71** | .82** | 1 | | | |
| 7. | Intensifying the lesson and activating students | .30* | .13 | .25* | .67** | .75** | .85** | 1 | | |
| 8. | Adapting instruction to student differences | .22 | .09 | .22 | .53** | .44** | .59** | .67** | 1 | |
| 9. | Teaching students thinking and learning strategies | .19 | .04 | .06 | .59** | .56** | .70** | .76** | .76** | 1 |

** Correlation is significant at the .01 level (two-tailed).
* Correlation is significant at the .05 level (two-tailed).

To assess the fit of our theoretical model with the empirical data, we first tested the factor structure as a whole (see Figure 1). The starting point for this analysis was a matrix of the intercorrelations across all model variables (Table 5). We set one of the loadings on the latent exogenous variable (student teachers' learning) and one of the loadings on the latent endogenous variable (student teachers' effective teaching behavior) to equal 1.0, to establish a common metric (Long 1983). The statistical test showed a chi-square value of 62.80, with 26 degrees of freedom, and a *p*-value of .00. The root mean square error of approximation (RMSEA) of .15, standardized root mean residual (SRMR) of .067 and confirmatory fit index (CFI) of .89 indicated the poor fit of the model to the data. The modification indices also revealed strong covariance (theta-epsilon = 18.56) in the measurement error variables for ADAPTING and STRATEGIES, that is, the two most difficult teaching behaviors for teachers (Van de Grift et al. 2011) were not explained well by the construct of effective teaching behavior. A possible explanation is that these behaviors are indeed beyond the reach of student teachers, because the student teachers in this study scored more weakly than strongly on both of these teaching behaviors ($M_{ADAPTING}$ = .52; $M_{STRATEGIES}$ = .59). Teacher development theories (Berliner,1994, 2001; Fuller & Bown, 1975; Huberman, 1989) similarly describe beginning teachers' focus on their own position, classroom management and subject matter content knowledge rather than on students' needs and learning processes. Therefore, we removed the observed endogenous variables ADAPTING and STRATEGIES from the model. In our reassessment of the fit of the model, the statistical test showed a chi-square value of 14.61, with 13 degrees of freedom, and

a *p*-value of .33. The RMSEA of .043, SRMR of .048, and CFI of .99 indicated good fit.

Next, we tested two measurement models pertaining to the relationships of the three learning activities (indicators) and the learning construct (latent exogenous variable) and of the four effective teaching behaviors (indicators) and the effective teaching behavior construct (latent endogenous variable). The standardized factor loadings ($\lambda$), standard errors, and *t*-values of the different indicators of the two latent variables were our main focus (Tables 6 and 7). The *t*-values were all well above 1.96 (i.e., significant factor loadings), so we validly measured student teachers' participation in learning and effective teaching behaviors. For learning, the standardized factor loadings indicated that collaboration was the most important indicator (.72), followed by developing knowledge and skills (.69). Reflection on experiences was the least important indicator (.38). In contrast, the standardized factor loadings indicated that all four remaining teaching behaviors were important indicators.

***Table 6***

*Standardized factor loadings (λ), standard errors, and t-values for learning.*

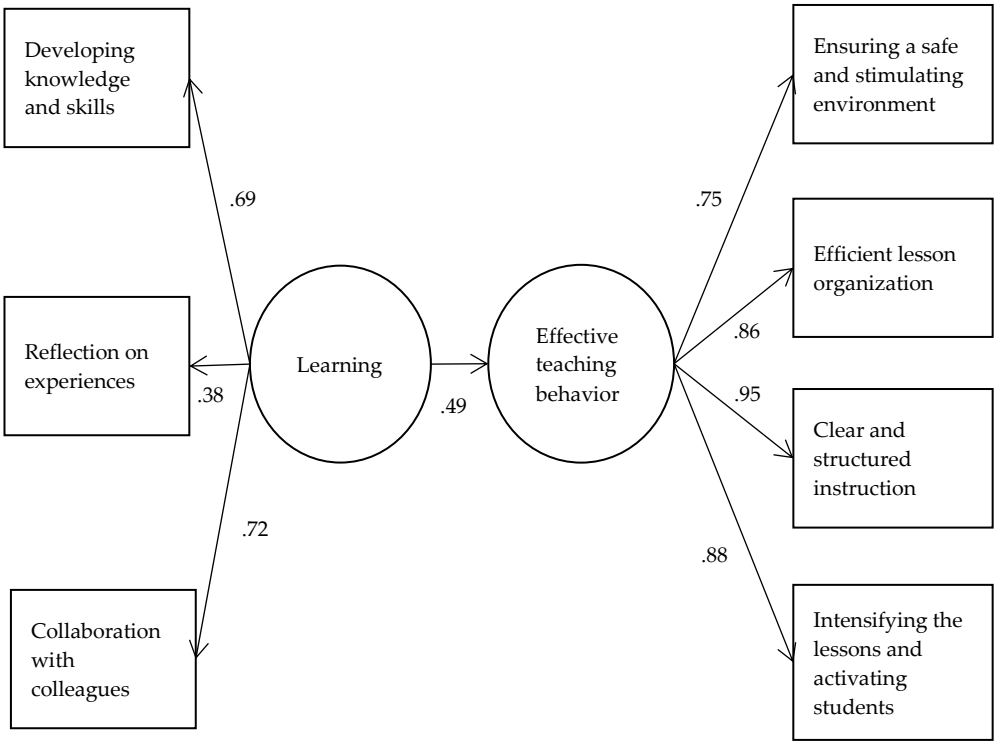
| | *Standardized Factor Loadings* | *Standard Errors* | t-*Values* | *Significance (two-tailed)* |
|---|---|---|---|---|
| Developing knowledge and skills | .69 | – | – | |
| Reflection on experiences | .38 | .18 | 2.39 | .02 |
| Collaboration with colleagues | .72 | .26 | 3.18 | .002 |

***Table 7***

*Standardized factor loadings (λ), standard errors, and t-values for effective teaching behavior*

| | *Standardized Factor Loadings* | *Standard Errors* | t-*Values* | *Significance (two-tailed)* |
|---|---|---|---|---|
| Ensuring a safe and stimulating environment | .79 | .09 | 8.32 | .001 |
| Efficient lesson organization | .86 | .08 | 11.31 | .001 |
| Clear and structured instruction | .95 | - | - | |
| Intensifying the lesson and activating students | .88 | .08 | 11.92 | .001 |

As our final testing step, we considered the structural model with the relationship between learning (exogenous variable) and effective teaching behavior (endogenous variable). We found a moderate to strong, positive relationship, with a standardized path coefficient ($\gamma$) of .49 ($p < .005$, standard error = .19, $t = 2.85$). When student teachers participated more in learning, their teaching behaviors were more effective. In general, when student teachers are better professional learners, they also are more effective teachers. We present the results of the SEM analysis in Figure 2.




Notes: $\chi^2 = 14.61$, df = 13, RMSEA = .04, SRMR = .048, CFI = .99. All ps < .02.

***Fig. 2**. Standardized SEM solution*

### 6.3.4 Student teacher profiles and effective teaching behaviors

Table 8 presents the scores of the four remaining teaching behaviors for each student teacher profile. The independent sample *t*-tests showed that three of them differed significantly across student teacher profiles: EFFICIENT (t(65) = 2.28, p < .05), CLEAR (t(65) = 2.47, p < .05), and ACTIVATING (t(65) = 2.41, p < .05). Student

teachers belonging to the HP-profile are significantly more effective teachers concerning these three effective teaching behaviors than student teachers belonging to the LP-profile. These results confirmed and refined the result of our SEM analysis: When student teachers are better professional learners, their lesson organization is more efficient, their instruction is clearer and more structured, their lessons are more intensive and they activate their students more. Finally, we note that with our cross-sectional study, we necessarily describe a correlational, not a causal, relationship.

***Table 8***
*Means for four effective teaching behaviors per learning profile (N = 67).*

| | *Cluster 1 'High participation profile'* (n = *43)* | *Cluster 2 'Low participation profile'* (n = *24)* |
|---|---|---|
| Ensuring a safe and stimulating environment | .80 | .78 *ns* |
| Efficient lesson organization | .78 | .68 |
| Clear and structured instruction | .76 | .66 |
| Intensifying the lesson and activating students | .71 | .61 |

## 6.4 Conclusions and discussion

With this study, we have determined that student teachers, according to our expectation, vary in their participation in learning activities important for career-long learning. The differences in participation in learning activities across student teachers were well reflected in the student teacher profiles we identified: the HP-profile (64%), characterised by relatively high (close to regular) participation in career-long learning activities, and the LP-profile (36%), characterised by relatively low (mainly close to rare) participation in the three learning activities. Although all learning activities of developing and updating knowledge and skills, reflecting on teaching experiences and collaborating with colleagues are integrated in the modern school-based teacher education programs, not all student teachers use the opportunities and resources available in their learning and working environments to advance their professionalization through active learning (Buitink & Beijaard, 2007). This finding is consistent with differences in student teachers' learning orientations found by Oosterheert and Vermunt (2001) and Hagger et al. (2008), and differences in their self-regulation found by Endedijk et al. (2012). In this first, crucial stage of the learning continuum, because most influential for student teachers' further professional development (Conway et al., 2009; Endedijk et al.,

2012), 64% of the student teachers engage regularly in learning activities and are likely to pursue these activities in the next stages of the learning to teach continuum, and consequently to become and stay a career-long learning teacher (Buitink & Beijaard, 2007; Eraut, 1994; Hammerness et al., 2005). More than a third of the student teachers, however, participate significantly less often, close to rarely in developing and collaborative activities and somewhat more often in reflective activities, and is it doubtful whether they become and stay career-long learning teachers.

With this exploratory study, we also identified a relationship between student teachers' participation in learning activities and their effective teaching behaviors. As their participation increases, the effectiveness of their teaching behaviors increases as well. Although student teachers' teaching behaviors are in an early stage, differences in teaching behavior were shown to be visible and observable. For the student teachers belonging to the HP-profile a significantly more effective teaching behavior was proven to be observable for EFFICIENT, one of the two easy teaching behaviors, and for two teaching behaviors, CLEAR and ACTIVATING, reflecting intermediate difficulty (Van de Grift et al., 2011). ADAPTING and STRATEGIES, the most difficult teaching behaviors to perform, were removed from the model: The student teachers in this study scored relatively low on these teaching behaviors. Furthermore, ADAPTING and STRATEGIES were not explained well by the construct of effective teaching in the model, which could indicate that these two teaching behaviors indeed are beyond the reach of student teachers. As regards the teaching behavior SAFE, the student teachers belonging to the HP-profile as well as those belonging to the LP-profile were able to perform this teaching behavior in a satisfactory way. This could indicate that SAFE indeed is the most easy teaching behavior to perform. In conclusion we can say that, just like experienced teachers (Timperley et al., 2007; Van Veen et al., 2010), student teachers who engage in learning activities as career-long learners are more effective teachers of three observable behaviors in the instructional dimension (Seifert, 1999), what is an important finding. Already during their teacher education programs, their lesson organization is more efficient, their instruction is clearer and more structured, their lessons are more intensive and they activate their students more. These student teachers belonging to the HP-profile, who are significantly more effective teachers than the student teachers belonging to the LP-profile, in all probability will continue to improve and refine their teaching practices as career-long learning professionals. However, for more than a third of the student teachers belonging to the LP-profile who are significantly less effective teachers, it is doubtful whether they become and stay career-long learning

teachers, and consequently will improve and refine their teaching practices over time, which is worrisome.

Despite the limited scope of this exploratory study, no studies thus far have specified student teachers' learning practices important for career-long learning or their association with outcomes relevant to their teaching practices. This study thereby contributes to extant literature. We consider a better understanding of student teachers' learning and its relation to effective teaching behaviors very important, because it offers insights into this crucial, initial teaching and learning stage, which sets the stage for the active, career-long learning practices that will help teachers refine their teaching effectiveness over time (Endedijk et al., 2012; Eraut, 1994; Hammerness et al., 2005).

### 6.4.1 Future research

The results of this study allow us to describe the relationship between student teachers' participation in learning activities and their effective teaching behaviors, but do not allow us to explain it. This approach is acceptable for our early, explorative study, but it limits the interpretability of the findings and their relevant implications for student teachers and teacher education. On-going research should address the complex web of factors, both contextual and personal, that may be involved in student teachers' learning and the connection to effective teaching behaviors.

To begin with the contextual variables which are highly influential for the learning to teach processes, such as learning culture, attitudes of the cooperating teachers, and the role of mentors at the practice school (Kagan, 1992; Kelchtermans et al., 2010). The culture at the practice school could be focused on teaching only, or could be a learning environment for pupils as well as for teachers, with a shared vision of education, focus on learning, and sufficient time and support (Little, 2006; Richardson, 1998; Wayne, Yoon, Zhu, Cronen, & Garet, 2008). Related to the learning culture is the attitude of the cooperating teachers. In this study, for student teachers we found a learning pattern for developmental and collaborative activities comparable to experienced teachers. It would be interesting to investigate whether the cooperating teachers, who in the Netherlands turn out to vary widely in the extent to which they participate in learning activities (Bakkenes et al., 2010; De Vries et al., 2013a; Diepstraten et al., 2011; Vogels, 2009), and therefore quite often reflect a rather 'restricted' (Hoyle, 1980), autonomous, teaching-oriented professionality implicitly or explicitly, are 'role models' for the student teachers entering the school and the profession. The role of the mentor also is important, in creating a challenging environment for the student teacher with a focus on both practical support and personal growth (Geldens, 2007; Giebelhaus & Bowman,

2002). Good mentoring even could contribute to the development of teaching practices (Giebelhaus & Bowman, 2002).

In addition to the contextual factors, there are also important personal factors as the student teacher's biography and past experiences (Kagan, 1992). Student teachers have spent a 15 000-hour apprenticeship watching other teachers teach (Lortie, 1975), which has a profound impact on how they understand and enact teaching and learning to teach. These educational experiences, often unconscious and affective in nature, formed their attitudes and values about learning and teaching (Kagan, 1992; Pajares, 1993). For experienced teachers a link was found between their beliefs about learning and teaching and their participation in learning activities: the more student-oriented the beliefs are, the more the teachers participate in learning activities, and no relationship was found between subject matter-oriented beliefs and participation in learning activities (De Vries et al., 2013a). Further research should explore the role of beliefs in relation to learning for student teachers. Furthermore, the role of student teachers' self-efficacy beliefs appears important, in that greater efficacy increases effort, which improves teaching performance, whereas lower efficacy has the reverse effects (Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998). For experienced teachers positive relationships were also found between self-efficacy beliefs and teachers' in-service learning (Bandura, 1993; Geijsel, Sleegers, Stoel, & Krüger, 2009; Goddard, Hoy, & Woolfolk Hoy, 2000; Runhaar, Sanders, & Yang, 2010). In this light, further research should consider the connection we found between greater participation in learning activities (more effort) and better teaching behavior.

We hope to include these contextual and personal factors in future models as well as students' learning outcomes, to investigate whether more effective student teachers produce better student outcomes. Furthermore, the learning activity of reflection requires further research. Compared to their more experienced colleagues in the Netherlands, student teachers exhibit average levels of participation in learning activities, generally equivalent to the participation of experienced teachers in developing skills and collaborative activities (De Vries et al., 2013a). However, unlike experienced teachers who seem to engage relatively less in reflective activities (De Vries et al., 2013a; Dijkstra, 2009; Kwakman, 2003; Van Eekelen, 2005), student teachers engage more often in reflective activities than in other forms of learning. This finding might reflect the common focus on reflection in teacher education programs (Loughran, 2002), with student teachers performing many reflection assignments such as portfolios (Mansvelder-Longayroux , Beijaard, & Verloop, 2007). Although student teachers engage more often in reflective activities than in other forms of learning and also compared to

experienced teachers, this learning activity emerged as the least important indicator (.38) of the construct of student teachers' learning. In other words, better performing student teachers do not necessarily reflect more on their experiences. Student teachers' reflection, as a critical professional activity (Eraut, 1994; Schön, 1983), should help student teachers to 'see differently' and reframe situations (Schön, 1983), such that they might gain insights into how to understand better the situation and act on it (Korthagen et al., 2006). Student teachers' reflection instead seems rather superficial, such that they reflect more on teaching practice issues ('what works?' and 'how can I' questions) than on understanding underlying processes ('why' questions) (Mansvelder-Longayroux et al., 2007; Korthagen & Buitink, 2010). Student teachers seem rather interested in short term tips and tricks, than in becoming aware of their beliefs, eventually changing them, in order to really understand the situation and then act on it accordingly. Better performing student teachers probably experience fewer teaching problems, will not need the short term solutions, and may thus feel less need to reflect. Further research should consider more closely the relationship between reflection on experiences and learning.

### 6.4.2 Practical implications

Despite the explorative nature of this study, the findings offer some key implications for student teachers and teacher education. In particular, the variation in student teachers' learning, the existence of student teacher profiles, and the relationships with effective teaching behaviors are of interest for all persons involved in school-based teacher education programs. Although learning activities should be integral in any school-based teacher education (Bolhuis, 2004; Buitink & Beijaard, 2007; Feiman-Nemser, 2001), more specific interventions need to be developed to improve the onset of career-long learning processes during these formative years (Endedijk, 2010). Student teachers should explicitly learn, among other things, that learning itself is an integral part of teaching and discover how to continue learning successfully in practice after they have completed their formal initial teacher education (Beijaard, 2009; Bolhuis, 2004; Feiman-Nemser, 2001). But how can we ensure that student teachers use the opportunities and resources available in their learning and working environments to advance their professionalization through active learning (Buitink & Beijaard, 2007)? In accordance with research into ways to stimulate student teachers' learning activities in teacher education programs (Bolhuis, 2004; Bronkhorst, Meijer, Koster, & Vermunt, 2011; Buitink & Beijaard, 2007; Darling-Hammond, 2006; Dolan, 2012; Feiman-Nemser, 2001; Hagger et al., 2008; Korthagen 2012; Korthagen & Buitink, 2010), we propose six key principles for school-based initial teacher education:

1 Student teachers should acknowledge that initial teacher education is just a first step in the perpetual continuum of professional teacher education.
2 Student teachers should receive an introduction to teacher education pedagogy and to theories of career-long learning.
3 Student teachers should be taught explicitly how to learn meaningful lessons through practice, by linking their own beliefs, practices and theory, as well as how to learn from both challenges and successes.
4 Student teachers should learn with and from peers; cohort groups in teacher education could provide professional communities of teachers-as-learners.
5 Teacher educators should model best practices in career-long learning.
6 The work context at the practice school should model best practices in career-long learning. A promising example of a strategy to promote integration of the learning activities of student teachers in collaboration with experienced teachers in the school context is for example lesson study (Lewis, Perry, & Murata, 2006).

Longitudinal studies will be required to determine if interventions in the initial stage of teaching based on these principles enhance teachers' initial learning, such that they continue to learn and develop and refine their teaching practices over time (Pianta & Hamre, 2009). These studies would probably need to span 10 years or more (Berliner, 1988).

# Chapter 7
# Student teachers' beliefs about learning and teaching and their participation in learning activities

*This chapter investigates student teachers' beliefs about learning and teaching, the relationship between the two belief orientations and student teachers' participation in learning activities. Furthermore, whether and how student teachers combine their beliefs about learning and teaching in belief profiles is examined. Then, the relationship between these belief profiles and their participation in learning activities is investigated. The results indicate that student teachers hold equally strong subject matter–oriented and student-oriented beliefs, and also vary in their beliefs. A strongly positive and significant relationship was found between a student orientation and learning, whereas a weakly negative and non-significant relationship was found between a subject matter orientation and learning. Furthermore, two combined belief profiles with different strengths were identified. The higher the scores on student and subject matter orientation, the higher student teachers' participation in learning activities.*

This chapter is based on:

De Vries, S., Jansen, E. P. W. A., Helms-Lorenz, M., & Van de Grift, W. J. C. M. Student teachers' beliefs about learning and teaching and their participation in career-long learning activities. Submitted for publication.

## 7.1 Introduction

Teacher learning offers an important means to increase teacher quality and improve the quality of student learning, which makes it an essential, integral part of the teaching profession (e.g., Day & Sachs, 2004). Over the past 20 years, teacher learning increasingly has come to be viewed on a continuum: from initial education, through induction, to in-service (Feiman-Nemser, 2001), including important career-long learning activities, such as updating knowledge and skills, reflection on teaching experiences, and collaboration with colleagues (e.g., Timperley, Wilson, Barrar, & Fung, 2007). Teacher learning begins with teachers' initial education, which is a crucial phase in the learning-to-teach continuum that determines student teachers' further professional development (Endedijk, Vermunt, Verloop, & Brekelmans, 2012).

A recent study in the Netherlands of student teachers' participation in learning activities (De Vries, Jansen, Helms-Lorenz, & Van de Grift, Chapter 6), showed that they vary in the extent to which they participate, with higher participation associated with more effective teaching behavior. Although many personal and contextual factors likely influence student teachers' learning, an important personal factor, namely beliefs about learning and teaching, has received limited attention to date. Such beliefs, classified as student- or subject matter–oriented (e.g., Van Driel, Bulte, & Verloop, 2007), were shown to relate to participation in learning activities for experienced teachers: The more student-oriented the beliefs, the more they participate (De Vries, Van de Grift, & Jansen, 2013a, Chapter 3). How is this at the beginning of their careers in initial teacher education, where student teachers develop their own personalized learning patterns (e.g., Hammerness et al., 2005)? Our goal with this study is to obtain information about student teachers' beliefs about learning and teaching, and to investigate the relationship with their participation in learning activities in a school-based teacher education setting for secondary education in the Netherlands, in order to gain insights in this crucial, brief, initial teaching stage, during which teachers should establish patterns of career-long learning.

### 7.1.1 Beliefs about learning and teaching

Student teachers' beliefs summarise their attitudes toward and values related to teaching, students, and the education process. Two particularly important elements in shaping prior beliefs are exemplary models of teachers and the student teacher's self-image as a learner (Kagan, 1992). Student teachers have undertaken 15 000-hour apprenticeships, watching other teachers teach (Lortie, 1975). On the one hand, these beliefs reflect the nature of the instruction that teachers have provided these students; on the other hand, student teachers typically have seen

only the outward signs of teaching (Conway, Murphy, Rath, & Hall, 2009). Furthermore, student teachers often extrapolate from their own experiences as learners, assuming that the students they teach will possess aptitudes, problems, and learning styles similar to their own (Kagan, 1992). As a result, student teachers' beliefs often are simplistic, lacking the coherence or structure obtained from different perspectives on teaching (e.g., Sugrue, 1997; Tillema, 1995).

Studies investigating student teachers' beliefs about learning and teaching often show that student teachers are oriented more toward the subject matter than toward students (Doyle, 1997; Holt-Reynolds, 1992; Joram & Gabriele, 1998). A subject matter orientation refers to more traditional forms of transmission teaching, with a focus on the transmission and thus learning of content and knowledge about a subject matter; a student orientation, instead is based on constructivist theories of knowledge and learning, focusing on the development of skills and competencies, such that students actively construct knowledge individually and through social interactions. Decker and Rimm-Kaufman (2008) find differences between elementary and secondary student teachers, in that secondary student teachers are more likely to prioritise subject matter and teacher-centeredness. However, studies comparing specific beliefs about learning and teaching among experienced and student teachers suggest that more experience makes teachers more oriented toward the subject matter (Alger, 2009; Giesbers & Bergen, 1992; Vogels, 2009).

These results are not univocal, seem to differ for elementary and secondary education, and probably are influenced by the vision that student teachers received during their own education, which is increasingly shifting toward more constructive visions of learning and teaching. In such a setting, we choose to investigate student teachers' actual beliefs about learning and teaching in secondary education. To study the relationship of these beliefs with student teachers' participation in learning activities, we include the two belief orientations as separate constructs in our theoretical model (Figure 1). Furthermore, research on experienced teachers indicates groups of teachers who adopt different belief structures (e.g., De Vries, Van de Grift, & Jansen, 2014, Chapter 4; Van Driel et al., 2007). With this study we seek the belief profiles of student teachers.

### 7.1.2 Career-long learning activities

Research on effective teacher learning has identified several characteristics of learning activities associated with improved teacher quality and student learning outcomes. Successful teacher learning is active and inquiry-based and it features collaboration and collegiality (e.g., Desimone, 2011; Timperley et al., 2007). These characteristics correspond with important adult learning principles, such as

reflecting on practical experiences, interacting and collaborating with others (e.g., Gravani, 2012; Merriam, 2008). To these key principles for adult learning, Bolhuis (2004, 2009) and Eraut (1994) add reading publications and studying theory. We therefore consider the development and updating of knowledge and skills, reflecting on experiences, and collaborating with colleagues as important career-long learning activities for the whole spectrum of teacher learning, including initial teacher education.

Initial teacher education in the Netherlands, similar to many other countries, is provided through school-based teacher education programs, often organized as partnerships between colleges/universities and schools, such that the schools host teaching practice and assign an experienced teacher as a mentor for each student teacher (Conway et al., 2009). Student teachers work (and sometimes are paid) as teachers in schools and continue their learning activities both in the schools and in their teacher education institute. The sources for learning thus are diverse, including not just theory and literature offered through the institute but also personal experiences during practice teaching at the school and interactions with a mentor, a school-based teacher educator, and colleagues at the practice school. The three key career-long learning activities are integral to school-based teacher education, thereby setting a foundation for their career-long learning (Buitink & Beijaard, 2007). We accordingly include all three activities as manifest factors of the latent construct of student teachers' learning in our theoretical model (Figure 1).

### 7.1.3 The aim of this study

Various studies investigate student teachers' beliefs to determine how they affect learning throughout teacher education programs, often with a focus on ways to change prior beliefs (e.g., Feiman-Nemser, McDiarmid, Melnick, & Parker, 1989; Joram & Gabriele, 1998; Sugrue, 1997; Tillema, 1995). With this study, we seek to understand what student teachers believe and which belief orientations facilitate or impede student teachers' participation in activities that encourage career-long learning. A few studies suggest some indications. For example, Kubler LaBoskey (1993) investigates student teachers' beliefs about learning and teaching in relation to their inquiry orientation (reflection). She proposes a continuum from 'common-sense thinkers' to 'alert novices' to 'pedagogical thinkers' and identifies relationships between seeing the teacher as a transmitter (subject matter orientation) and a lack of motivation to engage in reflection, as well as between seeing the teacher as a facilitator (student orientation) and an internal motivation to engage in reflection. Oosterheert, Vermunt and Denessen (2002) cite four comparable orientations toward learning to teach: 'survival', 'closed reproduction', 'closed meaning', and 'open meaning', such that the former are barely engaged in

learning and not particularly student oriented, whereas the latter use all available sources to understand learning and teaching and express a strong student orientation. The latter often is considered the most preferable orientation toward learning to teach.

These studies suggest possible relationships between the types of beliefs about learning and teaching and student teachers' learning to teach, in that differences in the belief content seem associated with ways of learning. The more student-oriented beliefs are, the more open, active, and continuous the ways of learning appear. We assume in turn some congruity between broader orientations to learning to teach and participation in career-long learning activities. Specifically, we expect a student orientation to be associated with participation in career-long learning activities (*H1*), whereas a subject matter orientation should produce a negative relationship (*H2*). Student teachers' belief profiles depend on the extent to which they adopt student- and subject matter–oriented beliefs. Therefore we expect to encounter a similar pattern in student teachers' belief profiles (*H3).* For our fine-grained analysis of the relationships of student teachers' beliefs with their participation in career-long learning activities, we specify four research questions (RQ):

1 What beliefs do secondary student teachers actually report about learning and teaching?
2 Is there a positive relationship between a student orientation and student teachers' participation in career-long learning activities, and a negative relationship for a subject matter orientation?
3 What patterns are discernible in student teachers' beliefs about learning and teaching?
4 Do belief profiles confirm the relationship between belief orientations and student teachers' participation in the activities important for career-long learning?

The first two questions also appear in our theoretical model, which we use to depict our predictions about the relations between beliefs and learning (Figure 1).

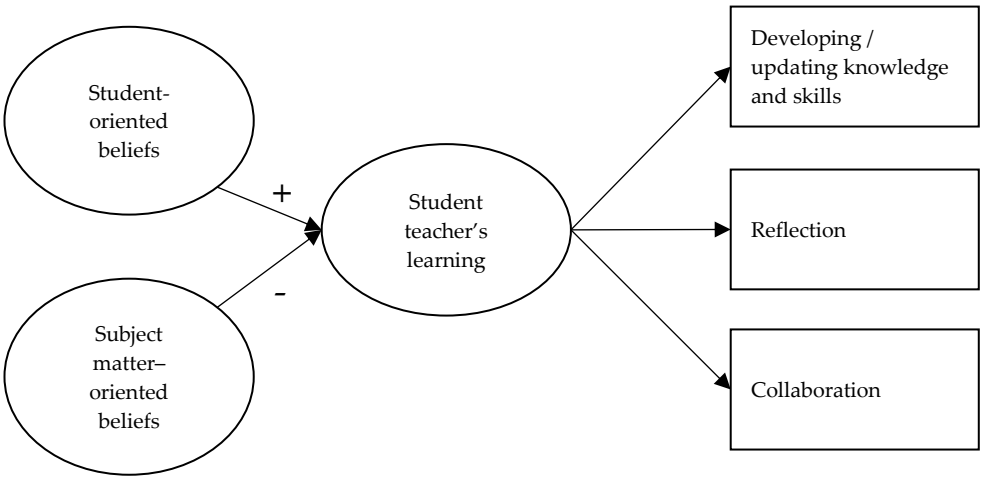



***Fig. 1***. *Theoretical model of links between student teachers' beliefs about learning and teaching and student teachers' learning*

## 7.2 Method

### 7.2.1 Participants

This research is part of a national, longitudinal research project, 'Effects of educating teachers at school', funded by The Netherlands Organization for Scientific Research (NWO, project number 411-09-802). The project seeks to compare teacher preparation routes to determine their effects on teacher effectiveness and retention. All schools in the Netherlands were approached with the question whether they had student teachers, and if they were willing to participate. Student teachers participated voluntarily. The total sample in the school year 2012-2013 featured 412 student teachers, of whom 110 agreed to complete the online beliefs and learning survey. Among this group, 62 were secondary student teachers, of whom 61% were women. The average age was 24.5 years (SD = 1.9; range 20–29 years). Except for minor differences, the gender and age distributions of the respondents of this sample resembles the national distribution of student teachers in Dutch secondary education (see Table 1).

***Table 1***
*Background characteristics of the sample in comparaison with the population.*

| | *Sample* | *Population*[1] |
|---|---|---|
| male – female | 39% – 61% | 44% – 56% |
| average age | 24.5 | 24.7 |

[1]DUO (2012)

### 7.2.2 Instruments

The online questionnaire sought to measure five constructs: student- and subject matter–oriented beliefs, and learning activities of updating, reflection, and collaboration. To measure the five constructs, we relied on items from De Vries et al. (2013a). To measure student teachers' *beliefs about learning and teaching*, the survey presented the items related to both orientations in random order and as a single set of items, to help minimize socially desirable biases (see Appendix A, p. 155). Respondents indicated the extent to which each item applied to them on a six-point Likert scale (1 = 'totally not applicable'; 6 = 'fully applicable'). Reliability analyses indicated that the two scales were reliable (subject matter orientation Cronbach's $\alpha$ = .77; student orientation Cronbach's $\alpha$ = .65).

To measure student teachers' *learning activities*, the items related to developing knowledge and skills, reflecting, and collaborating appeared as three separate sets (see Appendix B, p. 156), all measured on four-point Likert scales (1 = 'never'; 4 = 'very often'). Reliability analyses of the respective sets indicated that all three scales were reliable (developing Cronbach's $\alpha$ = .85; reflective Cronbach's $\alpha$ = .88; collaborative Cronbach's $\alpha$ = .88).

### 7.2.3 Data analysis procedures

We began by computing the mean scores of the belief scales, standard deviations, and minimum and maximum scores to assess student teachers' beliefs about learning and teaching (RQ1). Then, to determine the link between these beliefs and learning activities (RQ2), we computed the same descriptives for student teachers' learning activities, as well as the correlations for all five variables (i.e., two beliefs and three learning activities), as input for our structural equation model (SEM), implemented in LISREL 8.8 (Jöreskog & Sörbom, 2007). The measurement model involves the relationships of the three learning activities (indicators) with the learning construct (latent variable). To test the structural model, we considered the relationship of the two belief constructs (exogenous variables) with the learning construct (endogenous variable). We used several indices to evaluate the fit of our model, all of which were relatively insensitive to sample sizes (Hooper, Coughlan, & Mullen, 2008). To investigate the occurrence of different belief profiles (RQ3), we

followed a cluster analysis technique, in which we created subgroups (i.e., profiles) of relatively homogeneous cases, using the scores on the two beliefs scales. Independent sample *t*-tests served to assess the differences between the two belief orientations for each belief profile. To answer RQ4, we conducted independent sample *t*-tests of the differences across the three learning activities that determined the belief profiles.

## 7.3 Results

### 7.3.1 Student teachers' beliefs about learning and teaching

We standardized all the scale scores; in Table 2, we provide the mean scores, standard deviations, and minimum and maximum scores for the two belief orientations. Student teachers appear to hold equally strong subject matter–oriented ($M$ = .84) and student-oriented ($M$ = .83) beliefs. The standard deviations indicated that student teachers also varied in their beliefs.

***Table 2***

*Mean standardized scores, standard deviations, and minimum and maximum scores for student teachers' beliefs about learning and teaching (N = 62)*

| *Scale* | *M* | *SD* | *Min.* | *Max.* |
|---|---|---|---|---|
| Subject matter-oriented beliefs | .84 | .09 | .67 | 1 |
| Student-oriented beliefs | .83 | .10 | .63 | 1 |

### 7.3.2 Beliefs and learning

To test the link between beliefs and learning, we computed the mean scores and standard deviations for student teachers' learning activities (Table 3). In their learning, student teachers varied in their levels of participation in the three learning activities, namely, developing (M = .58), collaborating (M = .65), and reflective activities (M = .71). The standard deviations and differences between the minimum and maximum scores indicated that student teachers also varied in the extent to which they participated in learning activities.

***Table 3***
*Mean standardized scores, standard deviations, and minimum and maximum scores for student teachers' learning activities (N = 62)*

| *Scale* | *M* | *SD* | *Min.* | *Max.* |
|---|---|---|---|---|
| Developing knowledge and skills | .58 | .13 | .32 | .89 |
| Reflection on experiences | .71 | .12 | .50 | 1 |
| Collaboration with colleagues | .65 | .11 | .41 | .94 |

The Pearson correlation coefficients that we derived from computing the intercorrelations of all five variables (Table 4) indicated a rather strong correlation (.44) between subject matter and student orientations. The interscale correlations for learning ranged from .53 (developing and collaborative activities) to .59 (developing and reflective activities) to .64 (collaborative and reflective activities ). These relatively high interscale correlations suggested preliminary support for the one-dimensional latent construct of learning. Furthermore, high correlations between the belief orientations, particularly student orientation, and components of learning provided strong preliminary support for a potential link between beliefs and learning. Thus, it appeared reasonable to perform the SEM analysis next.

***Table 4***
*Intercorrelations among model variables (list wise, N = 62)*

| | *1.* | *2.* | *3.* | *4.* | *5.* |
|---|---|---|---|---|---|
| 1. Subject matter–oriented beliefs | 1 | | | | |
| 2. Student-oriented beliefs | .44* | 1 | | | |
| 3. Developing knowledge and skills | .20 | .45* | 1 | | |
| 4. Reflection on experiences | .15 | .50* | .59* | 1 | |
| 5. Collaboration with colleagues | .00 | .44 | .53* | .64* | 1 |

* Correlation significant at the .01 level (two-tailed).

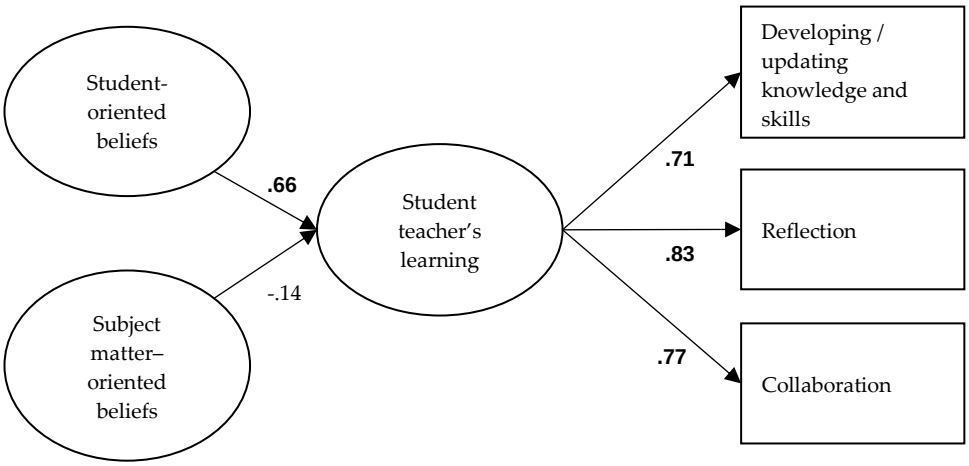
To assess the fit of our theoretical model with the empirical data, we first tested the factor structure as a whole (see Figure 1). The starting point for this analysis was a matrix of the intercorrelations across all model variables (Table 4). We set one of the loadings on the latent endogenous variable (student teachers' learning) to equal 1.0, to establish a common metric (Long 1983). The statistical test showed a chi-square value of 3.44, with 4 degrees of freedom and a *p*-value of .49. The root mean square error of approximation of .000, standardized root mean residual of .040 and confirmatory fit index of 1.00 indicated good fit.

Next, we tested the measurement model pertaining to the relationship of the three learning activities (indicators) and the learning construct (latent endogenous variable). The standardized factor loadings ($\lambda$), standard errors, and *t*-values of the different indicators of the latent variable were our main focus (Table 5). The *t*-values were all well above 1.96 (i.e., significant factor loadings), in support of the validity of our measure of student teachers' participation in learning. For learning, the standardized factor loadings indicated that reflection on experiences was the most important indicator (.83), followed by collaboration (.77). Developing knowledge and skills was the least important indicator (.71).

***Table 5***
*Standardized factor loadings (λ), standard errors, and t-values for learning.*

| | *Standardized Factor Loadings* | *Standard Errors* | t-*Values* | *Significance (two-tailed)* |
|---|---|---|---|---|
| Developing knowledge and skills | .71 | .16 | 5.34 | <.01 |
| Reflection on experiences | .83 | - | - | - |
| Collaboration with colleagues | .77 | .16 | 5.74 | < .01 |

As a final testing step, we considered the structural model with the relationship between beliefs about learning and teaching (two exogenous variables) and learning (endogenous variable). Between a student orientation and learning, we found a strong, positive significant relationship, with a standardized path coefficient ($\gamma$) of .66 ($p < .01$, standard error = .11, $t = 4.17$). When student teachers are more student oriented, they participate more in learning activities, in support of our hypothesis (*H1*). Between the subject matter orientation and learning, we found a weak, negative, non-significant relationship, with a standardized path coefficient ($\gamma$) of -.14 (standard error = .09, $t = -1.07$). Despite this negative tendency, in contrast with our prediction (*H2*), subject matter–oriented beliefs appeared unrelated to student teachers' participation in activities important for career-long learning. Finally, because we conducted a cross-sectional study, we necessarily describe a correlational, not a causal, relationship. We present the results of the SEM analysis in Figure 2.




Notes: $\chi^2 = 3.44$, $df = 4$, $p$-value = .49, root mean square error of approximation = .000, square root mean residual = .040, confirmatory fit index = 1.00. All bold $p$s < .01.

***Fig. 2****. Standardized SEM solution*

### 7.3.3 Belief profiles

We ran the cluster analysis on the scores of the two belief scales for all 62 cases. A hierarchical cluster analysis using Ward's method served to provide some sense of the possible number of clusters. By re-running the clustering with the *k*-means method, two profiles were created. Table 6 presents the mean scores of the belief scales of both clusters. All student teachers exhibited characteristics of both views at a relatively high level, reflecting the slight dominance of one type (i.e., student orientation in cluster 1; subject matter orientation in cluster 2), though the paired sample *t*-test showed that the differences were not significant. Independent sample *t*-tests showed that the clusters differed significantly from each other ($p < .001$) on the subject matter–oriented scale ($t(60) = -5.85$) and the student-oriented belief scale ($t(60) = -8.38$).

***Table 6***
*Means for the two belief orientations per cluster (N = 62).*

| | *Cluster 1 (n = 24)* | *Cluster 2 (n = 38)* |
|---|---|---|
| Subject matter–oriented beliefs | .90 | .80 |
| Student-oriented beliefs | .92 | .78 |

The scores for the clusters in Table 5 allow us to typify two types of student teachers. The first cluster (Cluster 1 = 39%) was characterised by relatively high student and subject matter orientations (between 'applicable' and 'fully applicable' on the Likert scale ), with a slight, not significant dominance by the student orientation. Student teachers in this cluster therefore can be defined as fully student and subject matter oriented (the fully-profile). The second cluster (Cluster 2 = 61%) was characterised by a somewhat lower student orientation and subject matter orientation (between 'more likely to be applicable than not' and 'applicable' on the Likert scale), with a slight, non-significant dominance by subject matter orientation. We refer to this cluster as rather subject matter and student oriented (the lower-profile).

### 7.3.4 Belief profiles and learning activities

Table 7 presents the scores of the three learning activities for each belief profile. The independent sample *t*-tests showed that the three activities differed significantly across belief profiles: developing activities ($t(60) = -3.70$, $p < .001$), reflective activities ($t(60) = -3.18$, $p < .005$), and collaborative activities ($t(60) = -3.07$, $p < .005$). Student teachers belonging to the fully-profile participated significantly more in all three learning activities than student teachers belonging to the lower-profile. These results confirmed and refined the result of our SEM analysis, as we expected (*H3*): When student teachers have a higher student orientation together with strong subject matter–oriented beliefs, they participate more in activities important for career-long learning.

***Table 7***
*Means for the learning activities per belief profile (N = 62).*

| | *Cluster 1: fully-profile (n = 24)* | *Cluster 2: lower-profile (n = 38)* |
|---|---|---|
| Developmental activities | .65 | .54 |
| Reflective activities | .77 | .67 |
| Collaborative activities | .70 | .62 |

## 7.4 Conclusions and discussion

With this study, we have determined a relationship between beliefs about learning and teaching and reported participation in learning activities by student teachers: The more student-oriented student teachers are, the more they participate in learning activities. No significant relationship exists between subject matter orientation and learning. With regard to the supposed differences in belief content

associated with ways of learning to teach (Kubler LaBoskey, 1993; Oosterheert et al., 2002), this pattern is partly what we expected to find. Student teachers who are positively oriented toward the learning and development of their students, seem also positively oriented toward their own learning and development, but the level of subject matter orientation seems rather neutral in relation to their participation in learning activities.

Another finding is that student teachers in general show an equal endorsement of both student and subject matter orientations, which is also reflected in their belief profiles. This can be explained either positively or negatively. Positively in the sense that the modern, constructivist teacher should combine serving as a facilitator and activator of students' learning processes with being a knowledge expert and competent deliverer of knowledge (Borko & Putnam, 1996; Scheerens, 2010) , and that student teachers seem to think in desired directions. This finding is particularly notable, considering the vast research that suggests simplistic, bad-structured and dominant subject matter orientated beliefs. Because beliefs depend on experience, we think that this combined and 'constructive' belief orientation might be explained by the changed education student teachers have received since the introduction in 1998 (in the Netherlands) of the innovative 'Studiehuis' educational approach (Stuurgroep Profiel Tweede Fase Voortgezet Onderwijs, 1994) that is based on constructive visions of learning and teaching and that has gradually permeated the Dutch education system. In a negative sense, this combined belief orientation also could suggest that the student teachers have not yet adopted either a subject matter or student orientation, because they have not thought through the ends and means of learning and teaching (Minor, Onwuegbuzie, Witcher, & James, 2002). This explanation also matches the strong correlation (.44) between the subject matter and student orientations that we found. In future research, we hope to repeat this measure of beliefs about learning and teaching to investigate whether this trend of combined belief orientations remains stable over time, with new student teachers and in longitudinal studies with the same student teachers.

A last interesting finding is the varying strength in student teachers' beliefs (the two profiles). The profile reflecting student teachers who combine both beliefs at the highest level was shown to be connected to the most active type of learning, involving regular participation in all three learning activities. Are student teachers holding both sets of beliefs more strongly more 'dedicated' than other student teachers, and more committed to learning? These may be the new teachers less likely to leave teaching, or more likely to be successful and effective teachers once they actually start their teaching career. Further research is needed to gain insight

into these differences in the strength of student teachers' beliefs, in relation to teacher effectiveness as well as teacher turnover.

### 7.4.1 Limitations

A limitation of this study stems from the instruments used. Although person-bound factors likely can be well assessed by the student teachers themselves, beliefs and practices have complex relationships and are not always congruent. In future research the use of more data sources, such as classroom observations and interviews, thus would be helpful to detect eventual inconsistencies in the beliefs and behaviors of student teachers.

Another limitation is that our measurements of beliefs took place during the course of the teacher education programs and the school year; contextual factors, such as mentoring styles and the learning culture at the practice school, as well as the specific teaching methods or styles employed by teacher educators at the teacher education institutes, could influence student teachers' development and eventual change of beliefs. We hope to include contextual factors in future research, together with important personal factors, some rather stable and others more impressionable, such as student teachers' motivation for teaching, their self-perception of teaching competence, their personal characteristics (the 'Big Five'), epistemological beliefs and self-efficacy beliefs. In relation to student teachers' effective behavior and learning outcomes, as well as to teacher turnover, we would like to investigate the processes at work more closely.

### 7.4.2 Practical implications

Despite the limitations of this study, the results have implications for teacher education programs that seek to enhance the chances that their student teachers will become student-oriented and - career-long learning professionals. Although 39% of the student teachers in our study represent the most desirable profile, the other 61% combine their beliefs at an intermediate level, associated with significantly lower participation in learning activities. This relatively large group may need specific interventions. Two important explanations support the development of interventions in initial teacher education. The first is that weaker beliefs may generally be easier to change (Mansfield & Volet, 2010). The second is that teachers' beliefs seem malleable during their years of teacher preparation, so the best moments for addressing them are during their initial teacher education and induction (Decker & Rimm-Kaufman, 2008). Important conditions for successful interventions include the amount of field experience, student teachers' abilities to reflect on and analyse their experiences, and dialogue with and support

by collaborating teachers, mentors, and teacher educators (e.g., Doyle, 1997; Morine-Dershimer & Corrigan, 1997).

In accordance with research into ways to stimulate student teachers' student orientation in teacher education programs, the following four key principles are proposed for the promotion of student orientation in school-based initial teacher education:

1 Student teachers should acknowledge that a good knowledge of the subject matter is important, but that student orientation is crucial. They should become acquainted with theories and research findings in the field and be explicitly engaged in reflection on their own preconceptions through different strategies and techniques. For example, changing images by exploring teachers' own images and metaphors for teaching, confronting contradictions, and investigating cases (Morine-Dershimer & Corrigan, 1997; Pajares, 1993).
2 Student teachers should be taught explicitly how to learn meaningful lessons through practice, by linking their own beliefs, practices and theory, as well as how to learn from both challenges and successes.
3 Teacher educators should model the student-oriented thinking they seek to encourage.
4 The work context at the practice school should model best practices in student orientation.

A promising strategy for (practice) schools to promote the integration of belief exploration with learning activities relies on lesson study (Lewis, Perry, & Murata, 2006). In a lesson study, a group of teachers, including student and experienced teachers, observes live classrooms and collects teaching and learning data, then collaboratively analyses those data to increase their understanding of the specific objects of learning and thereby facilitate learning in authentic situations and in collaboration with others.

Longitudinal studies will be required to determine the effects of such interventions during the initial stage of teaching education. They will offer more insights into a crucial, initial teaching and learning stage, which sets the stage for active, career-long learning practices that will help teachers refine their teaching effectiveness over time.

# Chapter 8
# Summary, general conclusions and discussion

*The five empirical studies presented in this thesis aim to clarify the relationship between beliefs about learning and teaching, classified as student oriented and subject matter oriented, and teacher learning, defined as career-long, job-embedded learning through self-directed and active participation in three activities of updating, reflection and collaboration, for both experienced teachers and student teachers. The relationship between student teachers' learning and their effective teaching behavior serves as a secondary research theme. In this chapter, the results of the studies are summarized, and the general conclusions of the studies are presented. Then, the scientific contribution of this thesis is discussed, and the practical implications of the results are presented. Finally, the limitations of this thesis are discussed and possible directions are suggested for future research.The main conclusion of this thesis is that student orientation is the foundation of teacher learning and, thus, of good teaching. This conclusion applies to both experienced teachers and student teachers. A considerable aspect of experienced and student teachers in the Netherlands proved to be not highly student oriented or a regular, active learner. This substantial group therefore is a source of concern.*

## 8.1 Summary of the results

Chapter 3 mainly served as an introductory character. First, teacher learning was shown to be well represented by participation in the three learning activities. Second, experienced teachers were found to exhibit a generally equal endorsement of student-oriented and subject matter–oriented beliefs and to participate significantly more frequently in updating and collaborative activities than in reflective activities. Third, a positive association was discovered between student-oriented beliefs and participation in learning activities, which indicates that the more teachers are student oriented, the more they participate in updating activities, reflect on their work and collaborate with their colleagues. Because no relationship was found between subject matter–oriented beliefs and teachers' participation in learning activities, these beliefs apparently do not influence, positively or negatively, teachers' participation in learning activities.

Chapters 4 and 5 focused more specifically on the experienced teachers themselves, to explicate the meaning of the found general relationship for day-to-day practice. Chapter 4 identified three distinctive, ascending (i.e., roughly ascending scores on the belief dimensions) teacher profiles: the combined student-oriented and subject matter–oriented profile (51%), with the highest scores on both dimensions; the predominantly student-oriented profile (29%); and the predominantly subject matter–oriented profile (20%), with lower scores on one and dominance of the other role. The examination of the link between the belief profiles and teachers' participation in learning activities showed several significant relationships: The higher the rank of the belief profile (i.e., higher scores on subject matter and student orientation), the higher the teacher's participation in learning activities. The predominantly subject matter–oriented profile scored significantly below the mean scores of the learning activities (except for updating), the predominantly student-oriented profile score was comparable to the mean scores and the combined student-oriented and subject matter–oriented profile scored significantly above the mean scores (except for collaboration).

Chapter 5 focused on experienced teachers' self-reported learning behavior, and three teacher learning profiles were derived, reflecting relatively low (24%, rare or close to rare), medium (54%, in between rare and regular), and high (22%, regular or close to regular) participation in three learning activities. Teachers matching these three profiles differed significantly in their student-oriented beliefs: Greater participation in learning activities related to more student-oriented beliefs. No relationships were found between teachers' learning profiles and their subject matter–oriented beliefs, whether positive or negative. In addition, female teachers participated significantly more in learning activities compared with male teachers.

For years of teaching a weak correlation was found with reflection: as teachers have more teaching experience, they reflect less.

Chapters 6 and 7 pertained to studies of student teachers. Chapter 6 found that student teachers vary in their participation in learning activities and that they participate significantly more frequently in reflective activities than in updating and collaborative activities. A positive association was discovered between student teachers' participation in learning activities and their effective teaching behaviors. Furthermore, two student teacher learning profiles were identified, reflecting relatively low (36%, mainly close to rare) and relatively high (64%, close to regular) participation in the three learning activities. Student teachers belonging to the latter profile proved to be significantly more effective teachers than student teachers belonging to the former profile. Already during their teacher education programs, their lesson organization is more efficient, their instruction is clearer and more structured, their lessons are more intensive and they activate their students more.

In Chapter 7, student teachers appeared to hold equally strong subject matter–oriented and student-oriented beliefs and also to vary in their beliefs. A strongly positive and significant relationship was found between a student orientation and learning, whereas a weakly negative and non-significant relationship was found between a subject matter orientation and learning. Furthermore, two combined belief profiles with different strengths were identified: a fully subject matter–oriented and student-oriented profile (39%) and a rather subject matter–oriented and student-oriented profile (61%). Student teachers with the former profile participated significantly more often in all three types of learning activities than student teachers belonging to the latter profile. In sum, these five studies provide keen insights into the current status of the Dutch teacher (both experienced and in initial education), qua beliefs and teacher learning.

## 8.2 General conclusions

The main conclusion of this thesis is that student orientation is the foundation of teacher learning and, thus, of good teaching. Teachers who have more learning and development orientations toward their students are more learning and development oriented themselves. They participate more often in updating activities, reflect more often on their experiences, and collaborate more often with their colleagues. And more actively learning teachers turn out to be better teachers.

Second, this thesis shows that this conclusion applies to both experienced teachers and student teachers. Student teachers in the first and most important stage of the career-long learning process, preparing the ground for later learning in subsequent

phases, were found to vary in their learning, just as experienced teachers, and the more often they participate in learning activities, the more effective their teaching becomes.

Third, this thesis shows that a considerable aspect of experienced and student teachers in the Netherlands is not being highly student oriented or a regular, active learner. Rather, today's teachers need, in addition to regular participation in learning activities, to fulfill educational roles of knowledge experts, competent deliverers of knowledge, and facilitators and activators of students' own learning processes. This substantial group therefore is a source of concern, on the one hand because of the direct consequences for their students and on the other because of the critical efforts to improve the quality of Dutch education.

## 8.3 Scientific contribution

This thesis makes a threefold scientific contribution to the topic of teacher learning. First, it empirically explores and shows the relative importance of the factors of student orientation and subject matter orientation for experienced and student teachers in relation to their participation in career-long learning activities, thereby bridging the teacher thinking and teacher learning research traditions. Second, it empirically investigates experienced and student teachers' participation in career-long learning activities, as well as their classification in learning profiles. Third, it empirically explores and shows a relationship between participation in learning activities and teaching behavior for student teachers.

## 8.4 Practical implications

Despite the explorative nature of the studies in this thesis, the findings offer several key implications to enhance student orientation and teacher learning and, with it, the quality of experienced teachers, student teachers, teacher education and secondary schools in the Netherlands. Improvement of the quality of the teacher is also one of the main priorities of the Dutch government. In recent years, the Dutch Ministry of Education, Cultural Affairs and Science has launched various plans—most recently, *Actieplan Leerkacht van Nederland* (Ministerie van OCW, 2007), *Actieplan Beter presteren* (Ministerie van OCW, 2011a), *Actieplan Leraar 2020* (Ministerie van OCW, 2011b) and *Lerarenagenda 2013-2020* (Ministerie van OCW, 2013a)—in which initial teacher education and further professional development are central to increase the quality of Dutch education. To contribute to the Dutch government's ambition, the findings of this thesis were translated in recommendations for educational policy, teacher education institutes, school administrators and (student) teachers themselves in the three domains of (1)

selection, (2) initial teacher education, and (3) secondary schools. An important focus is on student teachers in initial teacher education because this is a crucial phase in the learning-to-teach continuum, in which skills for ongoing learning and development are gained (Conway, Murphy, Rath, & Hall, 2009; Feiman-Nemser, 2001; OECD, 2005) and teachers' beliefs still seem malleable (Decker & Rimm-Kaufman, 2008; Doyle, 1997).

### 8.4.1 Selection

For the promotion of student orientation as a catalyst for career-long learning and, thus, for good teaching, selection is a potentially important instrument (Onderwijsraad, 2013). To enhance teacher quality, and with it the status and the attractiveness of initial teacher education, more recruitment and selection should be employed in initial teacher education. A strong professional group contributes to the quality of education, and long-term expectations are that this will have a priming effect on other (future) highly educated individuals on choosing the teaching profession so that the expected teacher shortages also will decrease in the long run. A first and relatively easy-to-organize method is self-selection through the provision of appropriate information and counseling to prospective teacher trainees so that better informed enrollment decisions are made (OECD, 2005). The importance of a student orientation and the perspective of career-long learning should be an important part of this information. A more laborious and complicated method is selection at the entrance of initial teacher education, as occurs in comparable and well-achieving countries in education. Finland, for example, follows a severe selection procedure to assess whether the individuals wanting to become teachers have the necessary motivation, skills, knowledge and personal qualities (OECD, 2011). Also in the Netherlands (Ministerie van OCW, 2013a), the possibilities of selection are now examined in the domains of knowledge and suitability for the profession in teacher education programs for a grade-two qualification in Higher Professional Education. In this context, student orientation and attitude toward learning should explicitly be addressed as selection criteria to ensure the best possible candidates enter teacher education. However, this might be even more important for teacher education programs at universities, because teachers with a university (Master) background, which is predominantly subject specific, seem to be more often subject matter oriented than teachers with a Higher Professional Education (Bachelor) background, which is more didactically focused, who are more often student oriented (Vogels, 2009). In addition to selection in initial teacher education, school administrators who want more student-oriented as well as learning-oriented teachers in their schools might also consider surveying incoming teachers about their sensitivity to student needs and their attitudes toward learning when appointing candidates to teaching vacancies (OECD, 2005).

### 8.4.2 Position, content and focus of initial teacher education

The second domain of recommendations to enhance student orientation and career-long teacher learning pertains to the position of initial teacher education in university programs and the organization and focus of initial teacher education programs. As mentioned, at Dutch universities initial teacher education for a grade-one qualification is positioned in Master programs after three years of subject matter in the Bachelor phase (the 3 + 2 teacher education model). This results in teachers who are more often subject matter oriented and less student oriented (Vogels, 2009). For the promotion of student orientation, the organization of university teacher education programs for a grade-two qualification in the Bachelor phase would be a good development, which should also have a sequel for the grade-one qualification.

Furthermore, in accordance with research on ways to stimulate both student teachers' student orientation and learning activities in teacher education programs, the following six key principles are proposed for the promotion of student orientation and the onset of career-long learning processes in school-based initial teacher education:

1 Student teachers should acknowledge that a good knowledge of the subject matter is important but also that student orientation is crucial, and they should become acquainted with theories and research findings in the field and be explicitly engaged in reflection on their own preconceptions through different strategies and techniques.
2 Student teachers should acknowledge that initial teacher education is just a first step in the perpetual continuum of professional teacher education and should receive an introduction to teacher education pedagogy and to theories of career-long learning.
3 Student teachers should be taught explicitly how to learn meaningful lessons through practice, by linking their own beliefs, practices and theory, as well as how to learn from both challenges and successes.
4 Student teachers should learn with and from peers; cohort groups in teacher education could provide professional communities of teachers-as-learners.
5 Teacher educators should model the student-oriented thinking they seek to encourage and best practices in career-long learning.
6 The work context at the practice school should model best practices in student orientation and career-long learning.

Student teachers who follow an initial teacher education program with such a focus will be more student-oriented and better prepared, career-long learning teachers. Such an orientation will enhance their learning and development as beginning teachers in induction programs (Helms-Lorenz, Slof, & Van de Grift, in

press), which will be implemented for all beginning teachers in the next few years (Ministerie van OCW, 2013a). It will also foster their continuing professional development, because all Dutch teachers now must explicitly learn over the course of their careers and be registered in the Teachers Register, which will be mandatory for every teacher in 2017 (Ministerie van OCW, 2013a, 2013b).

### 8.4.3 Strategies for secondary schools

Several strategies are specifically geared toward developing student orientation in initial teacher education as well as in schools, such as exploring own images and metaphors for teaching, confronting contradictions, and investigating cases (Morine-Dershimer & Corrigan, 1997). A promising, more inclusive strategy relies on lesson study (Lewis, Perry, & Murata, 2006). This strategy combines belief exploration with participation in learning activities, such as reflection and collaboration. In a lesson study, groups of teachers, including beginning and student teachers, observe live classrooms, collect teaching and learning data and then collaboratively analyze those data to increase their understanding of the specific objects of learning and thereby facilitate learning in authentic situations and in collaboration with others (Lewis et al., 2006). Comparable interventions include action research projects (De Vries, Beijaard, & Buitink, 2008; Ponte, 2002a), field and classroom experiences (Opfer & Pedder, 2011), collaborative inquiry (Timperley & Earl, 2012), and teacher networks (Voogt, Almekinders, Van den Akker, & Moonen, 2005).

Through these lesson-study-like approaches, student orientation is promoted, but also teachers' participation in learning activities is encouraged. First, collaboration with colleagues provides a tool for teachers to develop ownership and personalize their learning, and initial cooperation ultimately may transform into genuine collaboration. Second, through student-impact data teachers are encouraged to articulate, record, and reflect on their perceptions of the impact of their learning activities and related changes in classroom practices on their students' learning (Cordingley, Bell, Evans, & Firth, 2005a). Third, such a reflection on their perceptions offers the opportunity to explicit and confront the potential inadequacy of their original beliefs and to integrate newly acquired information and experiences into their existing systems of knowledge and beliefs (Borko & Putnam, 1996; Donaghue, 2003). In this way, assuming that they have the abilities to reflect on and analyze their experiences, teachers develop their beliefs about learning and teaching and discover the value of development as an important part of their professional role, by experiencing the link between participation in learning activities and improvements in their own practice, student progress and overall school improvement.

Lesson-study-like approaches are also characteristic of well-achieving countries in education (Diepstraten & Evers, 2012). In such countries, teachers are given the time and space to jointly prepare, implement, evaluate and adjust education. In the Netherlands, the Dutch Ministry of Education, Cultural Affairs and Science (Ministerie van OCW, 2013b) recently announced that teachers will receive more time and budget for lesson preparation, peer review, collegial consultation and continuing education. Dutch school administrators should embed such approaches structurally in the work of a team of teachers, as well as change their schools' qua focus and timetable. By doing so, they organize their schools as a learning environment not only for students but also for teachers. Such a school may also be referred to as a professional learning community (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). Various review articles, such as those by Waslander (2007), Van Veen, Zwart, Meirink, and Verloop (2010), Vescio, Ross, and Adams (2008), and Lomos, Hofman, and Bosker (2011), lend support to such environments. These studies also find positive effects on students' learning outcomes.

## 8.5 A critical reflection and suggestions for future research

The exploratory studies in this thesis present some limitations that also suggest directions for future research. First, the study samples were relatively small and, for experienced teachers, not completely representative (relatively less fully qualified teachers). Although this hampers to some extent the generalizability for the national context, the pattern found of the crucial role of student orientation was rather convincing for experienced teachers as well as for student teachers. Replications of this study with more participants, including sufficient fully qualified teachers, should confirm this finding. Furthermore, replications of this study in an international context could help determine whether the role of beliefs about learning and teaching and the participation in learning activities in the Netherlands are comparable in countries with different achievements in education and with other teacher learning policies (OECD, 2010); such replications would also provide more insights into the relative importance of these factors.

Second, only parts of the model are explained: connections between teacher beliefs and participation in learning activities for both experienced and student teachers, and connections between participation in learning activities and effective teaching behavior for student teachers only. Future research should test the complete model for experienced and student teachers, including an important extension that addresses the main objective of effective teaching behavior—namely, students who learn and achieve better.

A third limitation pertains to the instruments used. Although person-bound factors likely can be well assessed by the teachers themselves, to gain deeper insight into teachers' actions and perceptions, the use of more data sources would benefit further research (Borko & Putnam, 1996; Kagan, 1990). For the measurement of beliefs, beliefs and practices have complex relationships and are not always congruent (Bolhuis, 2000; Boulton-Lewis, Smith, McCrindle, Burnett, & Campbell, 2001; Calderhead, 1996; Fang, 1996). More fine-grained measurement instruments, such as interviews (Borg, 2011), logbooks (Tarman, 2012), metaphors (Patchen & Crawford, 2011), video diaries and essays (Stenberg, 2010), might help reveal nuances and eventual inconsistencies in teachers' beliefs about learning and teaching. Furthermore, the way participation in learning activities was measured warrants further study. In practice, teachers combine different learning activities, such as reflection and collaboration (e.g., 'I ask my colleagues to attend some of my lessons in order to get feedback on my teaching'). Yet the items for the updating, reflective and collaborative activities were divided into three separate sets, which fails to account for some overlap in learning activities. Moreover, the measure of participation in learning activities did not include any information about the content, quality or depth of learning (Vermunt & Endedijk, 2011). Teachers who are apparently engaged in the same visible activity may actually use different thinking processes, leading to different learning outcomes (Bakkenes, Vermunt, & Wubbels, 2010). Further research should consider using more in-depth instruments, such as the Inventory Learning to Teach Process (Oosterheert, Vermunt, & Denessen, 2002). Using different types of instruments would provide a comprehensive overview of how (student) teachers learn (Endedijk & Vermunt, 2013). A final limitation involves the comparability of the measurement for both groups of experienced and student teachers. To measure the extent to which the instruments measured the same concepts for both groups, multiple group confirmatory factor analysis could be conducted, for example, using Mplus, a latent variable modeling program (Muthén & Muthén, 2010).

### 8.5.1 Further suggestions for future research

First, studies, preferably longitudinal, are necessary to test the effects of the aforementioned recommendations in the domains of selection, initial teacher education and secondary schools to foster high-quality teacher learning.

Second, the connections between teacher beliefs and participation in learning activities were simply described, rather than explained. Further extensions of the model are required to provide clarity about personal factors, such as subject matter, years of experience, time and type of initial teacher education, motivation (Gagne & Deci, 2005), personality (Big Five), underlying epistemological beliefs

about the nature of knowledge and learning (Schommer, 1998) and self-efficacy beliefs (Bandura,1986). This last type of belief should have a positive relationship to teachers' participation in learning activities (Bandura, 1993; Geijsel, Sleegers, Stoel, & Krüger, 2009; Goddard, Hoy, & Woolfolk Hoy, 2000; Runhaar, Sanders, & Yang, 2010).

In addition to personal factors, contextual factors should be examined, because teacher learning is situated and influenced by the working context of each individual teacher. Although personal factors are more significant in predicting professional teacher learning activities than context factors (Kwakman, 2003; Van Woerkom, Nijhof, & Nieuwenhuis, 2001), important context factors are educational leadership (Geijsel, Sleegers, Leithwood, & Jantzi, 2003) and the school culture, including factors such as support by the principal, support for professional development and support from colleagues (Aelterman, Engels, Van Petegem, & Verhaeghe, 2007). Important context factors for student teachers include the role of the mentor at the practice school (Geldens, 2007; Giebelhaus & Bowman, 2002) and the teaching methods or styles employed by teacher educators at the teacher education institutes. Multi-dimensional models that include all these factors might clarify the processes at work and ultimately enhance both learning and teaching (Evans & Kozhevnikova, 2011). Moreover, a longitudinal assessment of such a multi-dimensional model might identify relevant developmental patterns across the continuum of teacher learning.

A third suggestion for future research pertains to the learning activity of reflection on experiences. Reflection on experiences is considered a central professional activity that is required to transform experience into knowledge (Schön, 1983). Experienced teachers had lower participation in reflective activities than in other forms of learning and also compared with student teachers, similar to the findings of Kwakman (2003) and Van Eekelen (2005). Is this a generation issue of teachers who did not learn reflective skills and, for that reason, do not engage in reflective activities? Chapter 5 showed that with more years of experience, teachers participate less in reflective activities, which previous research also suggests (Grangeat & Gray, 2007; Van Woerkom et al., 2002). Or is it a way of learning that is too idealistic for most teachers to carry out by themselves under most circumstances (Van Eekelen, 2005), and therefore teachers need more guidance and sustained opportunities (Kwakman, 2003)? Or are teachers hesitant to engage in reflective activities because doing so forces them to engage in an uncomfortable consideration of their shortcomings and anomalies (Korthagen, 2012; Runhaar et al., 2010; Schön, 1983)? In contrast, student teachers engaged more often in reflective activities than in other forms of learning and also compared with

experienced teachers. This might be because many teacher education programs have adopted reflection as a foundation (Loughran, 2002), such that student teachers must carry out reflective assignments. However, there were some inconsistencies for their participation in reflective activities. In Chapter 6, this learning activity emerged as the least important (.38) of the construct of student teachers' learning; in other words, better-performing student teachers do not necessarily reflect more on their experiences. However, in Chapter 7 it emerged as the most important indicator (.83) of the same construct; in other words, the stronger student teachers' beliefs, the more they reflect on their experiences. Beliefs have a relationship to thoughts and thinking, just as reflection does, which might explain why in Chapter 7 beliefs and reflection on experiences are highly connected. In relation to their effective teaching practice however (Chapter 6), student teachers' reflection may be rather superficial, or they may feel less need to reflect. In the former case, when student teachers have teaching practice issues, they may be more interested in short-term tips and tricks ('what works?' and 'how can I' questions) than in understanding underlying processes ('why' questions), by becoming aware of their beliefs and eventually changing them, to really understand the situation and then act on it accordingly (Korthagen & Buitink, 2010; Mansvelder-Longayroux, Beijaard, & Verloop, 2007). In the latter case, better-performing student teachers likely experience fewer teaching problems, do not need short-term solutions, and thus may feel less need to reflect. While reflecting and thinking (beliefs about learning and teaching) apparently go well together, this applies in a much lesser extent to reflecting and doing (teaching behavior). Further research should examine the relationship of reflection to experiences and learning both more closely and more in-depth for experienced and student teachers.

A fourth and last suggestion for future research concerns the beliefs about learning and teaching, in particular the different profiles found for experienced teachers (three profiles: the combined student-oriented and subject matter–oriented profile, a predominantly student-oriented profile and a predominantly subject matter–oriented profile) and for student teachers (two profiles: a fully subject matter–oriented and student-oriented profile and a rather subject matter–oriented and student-oriented profile). Could this combined belief orientation for student teachers be explained by a constructivist education they have received, or haven't they not yet decided about either a subject matter or student orientation (Minor, Onwuegbuzie, Witcher, & James, 2002)? Future research should examine whether this trend of combined belief orientations remains stable over time, with new student teachers and in longitudinal studies with the same student teachers. Concerning student teachers' differences in the strength of their beliefs, further

research is needed to gain insight into the relationship to teacher effectiveness as well as teacher turnover.

In conclusion, teachers are perhaps the most crucial actors in education settings. Therefore, questions about how they differ in their learning, the crucial role of their student orientation, whether their learning activities increase their quality, the quality of their schools and student learning are all of great importance. These questions offer insights into teachers' career-long learning practices, including the crucial, initial teaching and learning stage, which sets the stage for the active, career-long learning practices that help teachers refine their teaching effectiveness over time. This knowledge is essential not just for the (student) teachers themselves but also for educational administrators, directors of teacher education institutes, policy makers and the public at large. To provide high-quality education to all students, encouraging student orientation and teacher learning should be national priorities.

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# Appendices

## Appendix A. Beliefs about learning and teaching

| *Statements* |
|---|
| In my teaching, it is important that |
| **Subject matter-oriented beliefs** |
| 1. I pass on the subject matter to the students. |
| 2. the content of my lessons is good. |
| 3. students acquire knowledge. |
| 4. students really listen to what I'm telling them. |
| 5. there is order and discipline during the lesson. |
| 6. students learn the content of the subject matter. |
| 7. students learn how they can best learn the subject matter. |
| **Student-oriented beliefs** |
| 1. students learn autonomously to solve problems related to the subject matter. |
| 2. students, where relevant, learn cooperatively in groups. |
| 3. students develop their skills and competencies. |
| 4. I relate to the students' own knowledge and experiences. |
| 5. I take into consideration the differences in aptitudes and interests between students. |

## Appendix B. Learning activities

| *Statements* |
|---|
| **Developing activities** |
| 1. I read newly available material (e.g., through brochures or websites of publishers or visits of exhibitions on teaching materials). |
| 2. I read about educational reforms and promising practices (e.g., via newspapers, television, Internet). |
| 3. I read professional journals. |
| 4. I read scientific literature. |
| 5. I study subject matter exercise books and teaching materials, including manuals. |
| 6. I visit digital communities related to my subject matter. |
| 7. I read about training opportunities (e.g., via leaflets or websites of teacher training institutes). |
| 8. I participate in schooling and training sessions within the school. |
| 9. I participate in one-on-one coaching and mentoring in the classroom. |
| 10. I participate in professional development activities outside the school (e.g., courses, workshops, trainings, summer courses, networks). |
| 11. I visit conferences and meetings pertaining to my subject matter or hosted by my professional association. |
| **Reflective activities** |
| 1. After class, I reflect on my lessons. |
| 2. I analyze video recordings of my lessons to improve my teaching practice. |
| 3. I discuss with my students what they experience in my lessons, to improve my teaching practice. |
| 4. I visit lessons of colleagues to learn from them. |
| 5. I ask my colleagues to attend some of my lessons to get feedback on my teaching. |
| 6. I discuss events in my teaching with others to learn from them. |
| 7. I participate in peer review meetings at my school to learn from colleagues. |
| 8. I analyze a problem in my practice thoroughly before choosing a solution. |
| 9. I study products from students to understand how my approach has worked |
| 10. I ask students to fill out surveys for feedback on my lessons. |
| 11. I deal with problems in my teaching by looking at what the literature says about them. |
| 12. I use student performance data to, where needed, adjust my teaching. |
| 13. Once a problem or question arises in my teaching practice, I carry out a small research project into possible causes and solutions. |

| ***Collaborative activities*** |
|---|
| 1. I talk about teaching problems with colleagues. |
| 2. I support colleagues in their teaching problems. |
| 3. I share new teaching ideas with colleagues. |
| 4. I share learning experiences with colleagues. |
| 5. I talk about the way I deal with events in my lessons with colleagues. |
| 6. I talk to colleagues about what I think is important in education. |
| 7. I discuss scientific educational theories with colleagues. |
| 8. I discuss improvements and innovation in education at my school with colleagues. |
| 9. I use colleagues' teaching materials in my lessons. |
| 10. I write new curricula with colleagues. |
| 11. I construct (digital) teaching material with colleagues. |
| 12. I construct testing and examination materials with colleagues. |
| 13. I study student performance data with colleagues. |
| 14. I prepare lessons with colleagues. |
| 15. I experiment with new teaching methods with colleagues. |
| 16. I give lessons with colleagues (team teaching). |

# Nederlandse samenvatting

Het is belangrijk dat docenten leren, omdat ze op die manier hun eigen onderwijskwaliteit verhogen, en daarmee het leren en de leerresultaten van leerlingen en uiteindelijk scholen verbeteren. Leren is daarom ook een essentieel en integraal onderdeel van het leraarsberoep (Verloop, 2003). De laatste 20 jaar wordt het leren van docenten steeds vaker beschouwd als een continuüm met drie fasen: de initiële opleiding, de inductiefase en de rest van de carrière (Conway, Murphy, Rath, & Hall, 2009). De eerste, relatief korte, fase wordt daarbij vaak gezien als cruciaal, omdat hier de basis wordt gelegd voor carrièrelang leren van docenten. Belangrijke leeractiviteiten, en voor ervaren docenten bewezen effectief, zijn het op peil krijgen en houden van kennis en vaardigheden, reflecteren op onderwijservaringen en samenwerken met collega's (bijvoorbeeld Timperley, Wilson, Barrar, & Fung, 2007).

Docenten in het Nederlandse voortgezet onderwijs blijken echter sterk te verschillen in de mate waarin zij leeractiviteiten uitvoeren (bijvoorbeeld Diepstraten et al., 2011). Om dit te verklaren, is er al veel onderzoek gedaan naar factoren, zowel persoonlijke als contextuele, die van invloed zijn op het leren van docenten (bijvoorbeeld Kwakman, 2003). Onderwijsopvattingen van docenten, een belangrijke persoonlijke factor, hebben in dit verband tot nu toe echter maar weinig aandacht gekregen. Opvattingen zijn zo belangrijk, omdat ze "de beste indicatoren zijn van de beslissingen die mensen nemen in hun leven " (Pajares, 1992 , p. 307). Opvattingen sturen namelijk het denken en gedrag (Borg, 2001), en bepalen daarmee iemands leren en werken (Schommer, 1998). Er bestaan nauwelijks empirische studies naar de relatie tussen de opvattingen van docenten over leren en onderwijzen en hun eigen leren. In dit proefschrift staat daarom onderzoek naar deze relatie centraal, met als uiteindelijk doel om aanwijzingen te vinden om zo nodig en zo mogelijk opvattingen van docenten te veranderen en hun leren te bevorderen.

Aangezien het beschreven probleem in eerste instantie geldt voor ervaren docenten, zal eerst onderzoek worden uitgevoerd bij ervaren docenten. Maar omdat ervaren en oudere docenten waarschijnlijk meer moeite zullen hebben om hun opvattingen en gedrag te veranderen dan onervaren en vaak jongere leraren

(Hargreaves, 2005), rijst de vraag hoe de situatie is in de eerste, cruciale fase van het continuüm, waar docenten gemakkelijker zullen veranderen. Voordat dit wordt onderzocht, zal eerst worden nagegaan in hoeverre docenten in opleiding leeractiviteiten uitvoeren die van belang zijn voor carrièrelang leren, en of er net als bij ervaren docenten een relatie bestaat tussen het uitvoeren van deze activiteiten en de kwaliteit van hun onderwijsgedrag. Hoewel het leren van aanstaande docenten eerder onderwerp was van verschillende studies (bijvoorbeeld Mansvelder–Longayroux, 2006; Endedijk, 2010; Oosterheert, 2001), is naar deze beide aspecten voor zover bekend geen onderzoek gedaan. Dit proefschrift heeft daarom als secundair doel om informatie te krijgen over deelname in carrièrelange leeractiviteiten en de relatie met effectief onderwijsgedrag bij docenten in opleiding.

## Theoretische achtergrond

In dit proefschrift staan drie concepten centraal: het leren van docenten, onderwijsopvattingen van docenten, en effectief onderwijsgedrag. Aangezien deze drie concepten voortkomen uit drie verschillende onderwijsonderzoektradities, worden ze besproken in chronologische volgorde in relatie tot hun respectieve onderzoekstraditie. Om te beginnen de effectiviteit van docenten, daarna het denken van docenten en tenslotte het leren van docenten.

Docenteffectiviteitsonderzoek stamt uit de jaren ´60 van de vorige eeuw, en is daarmee een van de vroegste vormen van onderwijsonderzoek. Het doel was het achterhalen van succesvolle onderwijsprocessen met daaraan gekoppeld het effectieve gedrag van docenten (bijvoorbeeld Brophy & Good, 1986). Hoewel de kijk op leren zich in de loop van de tijd heeft ontwikkeld van behavioristisch, via cognitivistisch naar nu constructivistisch, is ditzelfde idee nog steeds de kern van het hedendaagse onderzoek naar effectief onderwijs en effectieve docenten (bijvoorbeeld Hattie, 2009; Marzano, 2008). Gebaseerd op hedendaags effectiviteitsonderzoek blijken belangrijke kenmerken van effectieve docenten: het creëren van een veilig en ondersteunend klasklimaat, een effectief klassenmanagement, het geven van gestructureerde en duidelijke informatie, de hoeveelheid en het tempo van de instructie, het activeren van leerlingen via vragen stellen en groepsopdrachten, het geven van feedback en adaptief onderwijs (Creemers & Kyriakides, 2012). Om de effectiviteit van het docentgedrag vast te stellen worden meestal observaties gebruikt. Hiervoor zijn vele observatie-instrumenten ontwikkeld, met name voor het basisonderwijs. Van de Grift (2007) heeft een instrument ontwikkeld dat ook goed bruikbaar bleek in het voortgezet onderwijs (Canrinus, 2011). Dit observatie-instrument bevat zes domeinen: het creëren van een veilig en stimulerend leerklimaat, efficiënt klasmanagement,

duidelijke en gestructureerde instructie, het geven van een intensieve les die leerlingen activeert, afstemmen van instructie en verwerking op verschillen en leerlingen leerstrategieën aanleren. In dit proefschrift wordt aan de hand van deze domeinen het effectieve onderwijsgedrag van docenten in opleiding vastgesteld.

Als reactie op het behaviorisme en in lijn met ontwikkelingen in de cognitieve psychologie, raakten onderzoekers in het midden van de jaren ´70 in toenemende mate geïnteresseerd in het denken van docenten, waarvan opvattingen onderdeel zijn (Fang, 1996). Kenmerken van opvattingen zijn dat ze bewust of onbewust kunnen zijn, en dat degene die ze heeft, vindt dat ze waar zijn, waarmee ze ook een emotionele lading hebben (Borg, 2001). Daarbij zijn opvattingen moeilijker te veranderen naarmate ze eerder verworven zijn, en hebben ze de neiging om in de loop van de tijd steeds sterker te worden naarmate ze meer 'gebruikt' worden (Pajares, 1992). Opvattingen van docenten over leren en onderwijzen zijn dan ook vaak sterk: ze hebben hun oorsprong in de vroege kinderjaren, waarna ze zich verder ontwikkelen tijdens de vele jaren die docenten doorbrengen op school, eerst als leerling, vervolgens als student in de lerarenopleiding, en daarna als docent. Wat betreft de inhoud van die opvattingen wordt in onderwijsonderzoek vaak onderscheid gemaakt tussen vakgerichte en leerlinggerichte opvattingen. Dit onderscheid is terug te voeren op verschillende visies op leren en onderwijzen. Vakgerichtheid verwijst dan naar meer traditionele vormen van onderwijs, met de focus op kennisoverdracht en vervolgens het leren van kennis. De docent staat er centraal als vakdeskundige en overdrager van kennis, zorgt voor rust en concentratie in de klas, houdt zich niet bezig met de behoeften van de individuele leerlingen, maar behandelt de hele klas als een soort collectieve leerling (Hargreaves, 2000). Leerlinggerichtheid is gebaseerd op constructivistische leertheorieën, en gericht op de ontwikkeling van vaardigheden en competenties waarbij leerlingen zelf actief en in samenwerking kennis construeren en waarbij docenten rekening houden met verschillen tussen leerlingen (Pieters & Verschaffel, 2003). Dergelijke constructivistische visies op leren en onderwijzen vereisen overigens een zeer goede kennis van het vak door de docent, evenals een hoog niveau van (vak)didactische kennis en vaardigheden (Borko & Putnam, 1996). Ook uit recent docenteffectiviteitsonderzoek komt naar voren dat docenten onderwijsvaardigheden dienen te beheersen die terug te voeren zijn op zowel traditionele als constructivistische modellen (bijvoorbeeld Kyriakides, Creemers, & Antoniou, 2009). De hedendaagse docent dient dan ook beide rollen te vervullen: als vakdeskundige en leverancier van kennis, en als facilitator en activator van leerprocessen van leerlingen. In dit proefschrift worden ook vakgerichte en leerlinggerichte opvattingen onderscheiden die docenten bij voorkeur combineren.

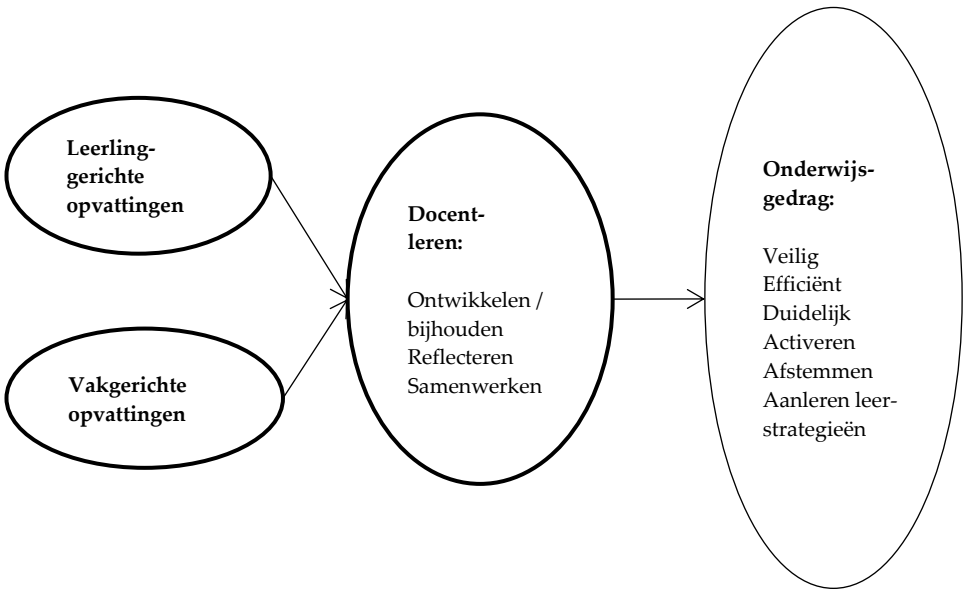
Onderzoek naar het leren van docenten is relatief het jongst, en kent verschillende benaderingen, waaronder met name de cognitief-psychologische (bijvoorbeeld Borko & Putnam, 1996) en de volwassenen- /werkplekleren benaderingen (bijvoorbeeld Lave & Wenger, 1991). Beide benaderingen hebben zich de laatste jaren ontwikkeld van een individualistische naar een meer situatieve visie op leren, en delen een opvatting van leren die actief, zelfgestuurd, constructief en reflectief is, die plaats vindt in fysieke en sociale contexten, en die is ingebed in zowel individuele als gezamenlijke activiteiten om nieuwe aan bestaande kennis te koppelen. In overeenstemming met deze visie op leren wordt het leren van docenten in dit proefschrift gedefinieerd als een carrièrelang, zelfgestuurd en actief proces, waarbij docenten diverse formele en informele leeractiviteiten uitvoeren zowel op als buiten het werk, die in lijn zijn met de doelstellingen van hun werk om hun kennis en opvattingen en/of hun onderwijsgedrag te veranderen. Wat betreft de keuze van de leeractiviteiten blijkt het met name effectief voor de eigen onderwijskwaliteit en voor betere leerlingresultaten wanneer docenten actief, onderzoekend en in samenwerking met collega´s leren (bijvoorbeeld Van Veen, Zwart, Meirink, Verloop, 2010). Het onderzoek naar het leren van volwassenen vindt vergelijkbare leerprincipes (bijvoorbeeld Merriam, 2008), en voegt daaraan het lezen en bestuderen van theorie en publicaties toe (bijvoorbeeld Bolhuis, 2009). Dit levert in totaal drie leeractiviteiten op, namelijk het op peil krijgen en houden van kennis en vaardigheden, het reflecteren op onderwijservaringen en het samenwerken met collega's. Deze leeractiviteiten zijn daarmee niet alleen van belang voor ervaren docenten, maar ook voor docenten in de inductiefase en voor docenten in opleiding. In de initiële lerarenopleiding die in Nederland steeds vaker plaats vindt in samenwerkingsverbanden tussen hogescholen/universiteiten en scholen, werkt de student op een school onder supervisie van een ervaren docent als mentor, en voert allerlei leeractiviteiten uit op zowel de school als het opleidingsinstituut. De student bestudeert theorie en literatuur, reflecteert op de eigen onderwijservaringen, en doet dit en andere zaken in samenwerking met bijvoorbeeld de mentor, de schoolopleider, de instituutsopleiders, andere collega´s van de school en medestudenten. In dit proefschrift worden daarom het op peil krijgen en houden van kennis en vaardigheden, het reflecteren op onderwijservaringen en het samenwerken met collega's als drie belangrijke leeractiviteiten beschouwd voor het hele continuüm van het leren van docenten.

## Theoretisch model en onderzoeksvragen

De drie theoretische concepten en hun onderlinge relaties zijn samengebracht in een theoretisch model (zie Figuur 1.). De centrale onderzoeksvraag daarbij is: *Wat is de relatie tussen opvattingen over leren en onderwijzen en deelname aan leeractiviteiten*

*door ervaren docenten en docenten in opleiding?* Wat betreft de veronderstelde richting van de relatie tussen onderwijsopvattingen en leren, baseert dit proefschrift zich op de epistemologische opvattingentheorie, die stelt dat werken en leren aan elkaar gerelateerd zijn, en dat beide beïnvloed worden door onderliggende epistemologische opvattingen over kennis en leren (Schommer, 1998). Deze onderliggende epistemologische opvattingen en onderwijsopvattingen blijken bij docenten nauw gerelateerd te zijn (bijvoorbeeld Chan & Elliot, 2004).

De secundaire onderzoeksvraag is: *Wat is de relatie tussen deelname aan leeractiviteiten en het effectieve onderwijsgedrag bij docenten in opleiding?* Voor de richting van de relatie tussen het leren van docenten in opleiding en hun effectieve onderwijsgedrag, baseert dit proefschrift zich op de positieve relatie tussen leren en onderwijsgedrag voor ervaren docenten.




***Figuur 1**. Theoretisch model (met de centrale concepten vetgedrukt)*

## Onderzoeksopzet

Om de onderwijsopvattingen en de frequentie van uitvoering van leeractiviteiten bij ervaren docenten na te gaan is een vragenlijst opgesteld. Deze vragenlijst is in april/mei 2010 verstuurd naar alle docenten van vier scholen voor voortgezet

onderwijs die samenwerken in de *School of Education*. In totaal hebben 260 docenten de vragenlijst volledig ingevuld.

Voor het onderzoek naar docenten in opleiding zijn de vragen over de leeractiviteiten in het kader van een NWO-onderzoeksproject Opleidingsvarianten (411-09-802) in 2011-2012 afgenomen bij 297 studenten van verschillende lerarenopleidingen voor voortgezet onderwijs in heel Nederland. In totaal hebben 67 studenten de vragen volledig beantwoord. Daarnaast zijn van deze studenten observaties van hun onderwijsgedrag verzameld. Vervolgens zijn in 2012-2013 de vragen over onderwijsopvattingen en leeractiviteiten in het kader van hetzelfde NWO-onderzoeksproject afgenomen bij 412 studenten, en door 62 volledig beantwoord.

Voor de data-analyse zijn 'structural equation modeling', factor analyse, clusteranalyse technieken, non-parametrische toetsen en parametrische toetsen toegepast.

## Samenvatting van de resultaten

In totaal zijn er vijf studies uitgevoerd. De eerste drie betreffen ervaren docenten, en zijn gebaseerd op een en dezelfde gegevensverzameling. De laatste twee betreffen docenten in opleiding, en zijn gebaseerd op twee verschillende gegevensverzamelingen.

De eerste studie heeft vooral een inleidend karakter. Het eerste doel van deze studie was om te onderzoeken of de drie leeractiviteiten het leren van docenten goed weergeven. Dit bleek het geval te zijn. Het tweede doel was om de onderwijsopvattingen en de deelname in leeractiviteiten van ervaren docenten in beeld te brengen: ervaren docenten bleken gemiddeld even sterke leerlinggerichte als vakgerichte opvattingen te hebben, en significant vaker hun kennis en vaardigheden op peil te houden en samen te werken, dan te reflecteren op hun onderwijservaringen. Het laatste doel was om de relatie tussen onderwijsopvattingen en uitvoering van leeractiviteiten te onderzoeken. Dit leverde een positief verband op tussen leerlinggerichte opvattingen en uitvoering van leeractiviteiten, wat betekent dat naarmate docenten meer leerlinggericht zijn, ze vaker leeractiviteiten uitvoeren. Er werd geen relatie gevonden tussen vakgerichte opvattingen en het uitvoeren van leeractiviteiten. Vakgerichte opvattingen blijken het uitvoeren van leeractiviteiten positief noch negatief te beïnvloeden.

De tweede en derde studie zoomen in op de manier waarop de resultaten uit de eerste studie concreet uitpakken bij ervaren docenten. In de tweede studie staan

daarbij de onderwijsopvattingen centraal. Aangezien docenten waarschijnlijk niet uitsluitend leerlinggericht of vakgericht zijn, maar beide typen opvattingen in verschillende sterktes zullen combineren, werd nagegaan op welke manier ervaren docenten hun onderwijsopvattingen combineren, en of docenten zijn in te delen in opvattingenprofielen. Er werden inderdaad drie verschillende docentprofielen geïdentificeerd: een gecombineerd leerling- en vakgericht profiel (51%), met de hoogste scores op beide dimensies, een leerlinggericht profiel (29%), en een vakgericht profiel (20%), beide met dominantie van de ene dimensie en significant lagere scores op de andere dimensie. Wat betreft de relatie tussen de opvattingenprofielen en het uitvoeren van leeractiviteiten, bleken docenten van het gecombineerde leerling- en vakgerichte profiel significant vaker leeractiviteiten uit te voeren dan gemiddeld (alleen samenwerken was gemiddeld). De docenten van het leerlinggerichte profiel scoorden ongeveer gemiddeld op het uitvoeren van de drie leeractiviteiten. Docenten van het vakgerichte profiel bleken significant minder vaak leeractiviteiten uit te voeren (het op peil houden was gemiddeld).

In de derde studie staat het uitvoeren van leeractiviteiten door ervaren docenten centraal. Aangezien eerder onderzoek al aantoonde dat ervaren docenten variëren in hun deelname aan leeractiviteiten, is onderzocht of ze gegroepeerd kunnen worden volgens hun gerapporteerde niveau van deelname aan leeractiviteiten. Docenten bleken inderdaad te kunnen worden ingedeeld in drie groepen: een 'lage' groep die zelden leeractiviteiten uitvoert (24%), een 'hoge' groep die regelmatig leeractiviteiten uitvoert (22%), en een grote 'gemiddelde' groep die er tussen in zit (54%). De drie groepen docenten bleken significant van elkaar te verschillen op leerlinggerichtheid: naarmate docenten meer leeractiviteiten uitvoeren, bleken ze leerlinggerichter. Daarnaast bleken vrouwen significant vaker leeractiviteiten uit te voeren dan mannen. Onderwijservaring bleek alleen zwak samen te hangen met reflecteren: naarmate docenten meer onderwijservaring hebben, reflecteren ze minder.

Studies vier en vijf betreffen docenten in opleiding, waarbij de vierde voorbereidend is voor de vijfde studie. In de vierde studie is onderzocht in welke mate docenten in opleiding leeractiviteiten uitvoeren die van belang zijn voor carrièrelang leren. Docenten in opleiding blijken te variëren in hun deelname aan leeractiviteiten, en ze voeren significant vaker reflectieve activiteiten uit dan dat ze hun kennis en vaardigheden op peil brengen of samenwerken. Verder is ook bekeken of ze kunnen worden gegroepeerd volgens hun gerapporteerde niveau van deelname aan leeractiviteiten. Dit leverde twee groepen aanstaande docenten op: een 'lage' groep (36%) die zelden leeractiviteiten uitvoert, en een 'hoge' groep (64%) die regelmatig leeractiviteiten uitvoert. Ten slotte is onderzocht of er een

relatie is tussen het uitvoeren van leeractiviteiten en de kwaliteit van hun lesgeven. Hierbij werd aangetoond dat docenten in opleiding die vaker leeractiviteiten uitvoeren effectiever onderwijsgedrag vertonen. Hun klasmanagement is efficiënter, ze geven een duidelijkere en meer gestructureerde instructie, en ze geven intensievere lessen die leerlingen meer activeren.

In de vijfde studie tenslotte, zijn eerst de onderwijsopvattingen van docenten in opleiding nagegaan. Ze bleken even sterke leerlinggerichte als vakgerichte opvattingen te hebben. Vervolgens is gekeken of er opvattingenprofielen bij docenten in opleiding zijn te onderscheiden. Dit leverde twee gecombineerde opvattingenprofielen op met verschillende sterktes: een 'hoog' gecombineerd leerling- en vakgericht profiel (39%) met de hoogste scores op beide dimensies, en een 'lager' gecombineerd leerling- en vakgericht profiel (61%), met significant lagere scores op beide dimensies. Daarna is de relatie onderzocht tussen onderwijsopvattingen van docenten in opleiding en het uitvoeren van leeractiviteiten. Hieruit bleek een sterk positief verband tussen leerlinggerichtheid en het uitvoeren van leeractiviteiten; voor vakgerichtheid werd een zwak negatief, niet-significant verband gevonden. Tenslotte bleken docenten in opleiding die tot het 'hoge' combinatieprofiel behoren significant vaker leeractiviteiten uit te voeren dan studenten in het 'lagere' opvattingenprofiel.

## Algemene conclusies

De belangrijkste conclusie van dit proefschrift is dat leerlinggerichtheid aan de basis blijkt te liggen van het leren van docenten, en daarmee van goed onderwijs. Docenten die meer gericht zijn op het leren en ontwikkelen van hun leerlingen, blijken ook meer gericht op hun eigen leren en ontwikkeling: ze houden vaker hun kennis en vaardigheden op peil, ze reflecteren vaker en werken vaker samen met collega's. En docenten die leren zijn betere docenten.

Ten tweede toont dit proefschrift aan dat deze conclusie niet alleen geldt voor ervaren docenten, maar ook voor docenten in opleiding. Aanstaande docenten in de eerste, belangrijk fase van hun loopbaan, waar de basis wordt gelegd voor het leren in de latere fasen, blijken net als ervaren docenten te variëren in hun leren, en naarmate ze vaker leeractiviteiten uitvoeren, blijken ze effectiever onderwijsgedrag te vertonen.

Ten derde laat dit proefschrift zien dat een aanzienlijk deel van de ervaren docenten en de docenten in opleiding in Nederland niet zeer leerlinggericht noch actieve en regelmatige leerders zijn. Hedendaagse docenten dienen echter regelmatig leeractiviteiten uit te voeren, en beide rollen te vervullen van facilitator en activator van leerprocessen van leerlingen en van vakdeskundige en leverancier

van kennis. Deze relatief grote groep is daarmee een bron van zorg, enerzijds vanwege de directe gevolgen voor hun leerlingen, anderzijds met het oog op het verhogen van de kwaliteit van het Nederlandse onderwijs.

## Praktische implicaties

De bevindingen van dit proefschrift bieden verschillende aanknopingspunten om in de praktijk de leerlinggerichtheid en het leren van docenten te stimuleren, en daarmee de kwaliteit van aanstaande docenten, ervaren docenten, lerarenopleidingen en scholen voor voortgezet onderwijs in Nederland te verbeteren. Verbetering van de kwaliteit van de docent is ook een van de belangrijkste prioriteiten van de Nederlandse overheid. In de afgelopen jaren heeft het Ministerie van Onderwijs, Cultuur en Wetenschappen diverse plannen gelanceerd (de meest recente zijn: *Actieplan Leerkracht van Nederland* (Ministerie van OCW, 2007), *Actieplan Beter Presteren* (Ministerie van OCW, 2011a), *Actieplan Leraar 2020* (Ministerie van OCW, 2011b) en *Lerarenagenda 2013-2020* (Ministerie van OCW, 2013a)) waarin de initiële lerarenopleiding en de verdere professionele ontwikkeling van de docent centraal staan om de kwaliteit van het Nederlandse onderwijs te verhogen. Om een bijdrage te leveren aan de ambitie van de Nederlandse overheid, zijn de bevindingen van dit proefschrift vertaald in aanbevelingen op het gebied van onderwijsbeleid, lerarenopleidingen, schooldirecties en (aanstaande) docenten zelf in drie domeinen: (1) selectie, (2) de initiële lerarenopleiding, en (3) scholen. Het accent ligt daarbij op aanstaande docenten, omdat zij hun opvattingen en gedrag waarschijnlijk makkelijker veranderen dan ervaren docenten, en op de initiële lerarenopleiding, omdat daar immers de basis wordt gelegd voor carrièrelang leren.

### Selectie

Om te bevorderen dat er meer leerlinggerichte en carrièrelang lerende docenten in het onderwijs komen te werken, is selectie een potentieel belangrijk instrument (Onderwijsraad, 2013). Lerarenopleidingen zouden daar meer gebruik van dienen te maken, omdat ze op deze manier niet alleen de kwaliteit van de docent verbeteren, maar ook de status en de aantrekkelijkheid van de lerarenopleiding verhogen. Een sterke professionele groep draagt niet alleen bij aan de kwaliteit van het onderwijs, maar kan op termijn ook een aanzuigende werking hebben op andere (toekomstige) hoogopgeleiden om het beroep van docent te kiezen, waardoor uiteindelijk ook het verwachte lerarentekort zal afnemen.

Een eerste methode die relatief eenvoudig is te organiseren, is zelfselectie door middel van het verstrekken van de juiste informatie en begeleiding aan potentiële aanstaande docenten, zodat ze beter geïnformeerd besluiten om zich al dan niet

voor de lerarenopleiding aan te melden (OECD, 2005). Het belang van leerlinggerichtheid en het perspectief op carrièrelang leren dienen daarvan een belangrijk onderdeel te zijn.

Een meer bewerkelijke en ingewikkelde methode is selectie aan de poort bij de initiële lerarenopleiding, zoals dit gebeurt in zeer goed presterende onderwijslanden. Finland bijvoorbeeld hanteert een strenge selectieprocedure om na te gaan of aanstaande docenten over de nodige motivatie, vaardigheden, kennis en persoonlijke kwaliteiten beschikken (OECD, 2011). Ook in Nederland worden momenteel de mogelijkheden van selectie op het gebied van kennis en geschiktheid voor het beroep nagegaan voor de tweedegraads lerarenopleidingen in het Hoger Beroepsonderwijs (Ministerie van OCW, 2013a). Hierbij zou men ook leerlinggerichtheid en positieve leerhouding als selectiecriteria dienen te betrekken. Voor de eerstegraads lerarenopleidingen aan de universiteiten zou dit overigens nog belangrijker zijn, omdat docenten met een universitaire achtergrond vaker vakgericht, en docenten met een HBO-achtergrond vaker leerlinggericht zijn (Vogels, 2009).

Naast selectie in de initiële lerarenopleiding, zouden ook schoolleiders die meer leerlinggerichte en lerende docenten in hun scholen willen hebben, bij vacatures op leerlinggerichtheid en leerhouding kunnen selecteren (OECD, 2005).

#### Positie en focus van de initiële lerarenopleiding

Een tweede domein om de leerlinggerichtheid en de leerhouding te bevorderen betreft de initiële lerarenopleiding, zowel qua positie als qua focus. De initiële, eerstegraads lerarenopleiding aan de Nederlandse universiteiten is na drie jaar vakstudie in de Bachelor fase gepositioneerd in het Master programma (het 3 + 2 model). Dit resulteert in docenten die vaker vakgericht zijn (Vogels, 2009). Voor de bevordering van leerlinggerichtheid lijkt de organisatie van de tweedegraads minor in de Bachelor fase een goede ontwikkeling. Op deze manier zou er ook een route ontwikkeld dienen te worden waarbij het werken aan de eerstegraads bevoegdheid 'indaalt' in de Bachelor fase.

Wat betreft de focus van de initiële lerarenopleiding, zijn op basis van de literatuur zes principes geformuleerd om leerlinggerichtheid te bevorderen, en om een goede basis te leggen voor carrièrelang leren. Studenten die een lerarenopleiding hebben gevolgd met een dergelijke focus, zullen leerlinggerichter en beter voorbereid zijn op carrièrelang leren. Het zal hun ontwikkeling versterken als beginnend docent in inductieprogramma's (Helms-Lorenz, Slof, & Van de Grift, in druk) die de komende jaren voor alle beginnende docenten worden ingevoerd (Ministerie van OCW, 2013a). Bovendien zal het hun professionele ontwikkeling stimuleren

gedurende de rest van hun carrière. Met de invoering van het verplichte Lerarenregister in 2017 wordt dit ook expliciet van alle Nederlandse docenten verwacht (Ministerie van OCW, 2013a, b).

### Strategieën voor scholen

Er bestaan verschillende strategieën die specifiek zijn gericht op de ontwikkeling van leerlinggerichtheid in zowel de initiële lerarenopleiding als in scholen, zoals bijvoorbeeld het werken met beelden en metaforen, en het werken met cases (bijvoorbeeld Morine-Dershimer & Corrigan, 1997). Een veelbelovende, meer omvattende strategie is de *lesson study* (bijvoorbeeld Lewis, Perry, & Murata, 2006). Deze strategie combineert het nadenken over de eigen onderwijsopvattingen met het uitvoeren van leeractiviteiten als lezen, reflecteren en samenwerken. In een *lesson study* ontwerpt een team docenten (inclusief beginnende en docenten in opleiding) samen een les voor een leerprobleem van leerlingen met als doel om alle leerlingen een specifiek onderwerp van een vak te laten begrijpen. Vervolgens geeft één docent de les en observeren de overige docenten. Daarbij verzamelen ze gegevens over het onderwijzen door de docent en het leren van de leerlingen. Vervolgens analyseren ze deze gegevens gezamenlijk, en stellen ze de les zo nodig bij en herhalen ze de cyclus.

*Lesson study*-achtige benaderingen zijn ook kenmerkend voor zeer goed presterende onderwijslanden (Diepstraten & Evers, 2012). In deze landen krijgen docenten de tijd en ruimte om samen onderwijs voor te bereiden, uit te voeren, te evalueren en aan te passen. In Nederland heeft Ministerie van Onderwijs , Cultuur en Wetenschappen ( Ministerie van OCW, 2013b) onlangs aangekondigd dat docenten meer tijd en budget zullen krijgen voor lesvoorbereiding, peer review, collegiale consultatie en professionele ontwikkeling. Nederlandse schoolleiders zouden dergelijke *Lesson study*-achtige benaderingen structureel dienen in te bedden in het werk van hun docententeams, en daarmee hun scholen reorganiseren qua focus en rooster. Scholen zouden daarmee leeromgevingen worden niet alleen voor leerlingen, maar ook voor docenten. Een dergelijke school kan ook worden aangeduid als een professionele leergemeenschap (Stoll et al., 2006). Diverse reviewstudies hebben het belang ervan ook onderstreept (bijvoorbeeld Waslander, 2007; Van Veen et al., 2010; Lomos, Hofman, & Bosker, 2011). Laatstgenoemde onderzoekers noteerden ook positieve effecten op de leerresultaten van leerlingen.

## Beperkingen van dit onderzoek

Een eerste beperking van het onderzoek beschreven in dit proefschrift is dat het theoretisch model enkel op onderdelen is getoetst. In vervolgonderzoek dient het

volledige model getoetst te worden met zo mogelijk daaraan toegevoegd de belangrijkste doelstelling van effectief onderwijsgedrag: leerlingen die beter leren en presteren.

Ten tweede waren de steekproeven relatief klein, en voor ervaren docenten niet geheel representatief (relatief minder eerstegraads docenten). Hoewel dit in zekere zin de generaliseerbaarheid voor de nationale context bemoeilijkt, is het de vraag of dit het duidelijke patroon van de cruciale rol van leerlinggerichtheid voor zowel ervaren docenten als voor docenten in opleiding fundamenteel aantast.

Een derde beperking betreft de gebruikte instrumenten die voor onderwijsopvattingen en leeractiviteiten zijn gebaseerd op zelfrapportage. Hoewel persoonlijke factoren waarschijnlijk goed beoordeeld kunnen worden door docenten zelf, zou in vervolgonderzoek van een combinatie van kwantitatieve en meer kwalitatieve instrumenten gebruik gemaakt dienen te worden om een breder, dieper en daardoor genuanceerder inzicht te krijgen in opvattingen en gedrag van docenten (Endedijk & Vermunt, 2013).

### Verdere suggesties voor vervolgonderzoek

Ten eerste zijn de onderwijsopvattingen en de uitvoering van leeractiviteiten en de relaties ertussen wel beschreven, maar niet verklaard. Uitbreiding van het model zou duidelijkheid kunnen verschaffen over de rol van persoonlijke en contextuele factoren. Wanneer dergelijk onderzoek longitudinaal kan gebeuren, zouden wellicht ook relevante ontwikkelingspatronen in het continuüm van docentleren kunnen worden geïdentificeerd.

Een tweede onderzoeksonderwerp betreft de leeractiviteit reflecteren op ervaringen. Deze leeractiviteit die wordt beschouwd als een centrale professionele activiteit die nodig is om ervaring om te zetten in kennis (Schön, 1983), voeren ervaren docenten minder vaak uit dan andere leeractiviteiten. Anderzijds voeren docenten in opleiding dezelfde leeractiviteit juist vaker uit dan andere leeractiviteiten, en ook vergeleken met ervaren docenten. Verder is er een interessante inconsistentie gevonden voor reflecteren bij docenten in opleiding. In de vierde studie blijkt reflecteren de minst belangrijke indicator (.38) van het construct leren van docenten, terwijl reflecteren in de vijfde studie de belangrijkste indicator (.83) blijkt. Al met al voldoende aanleiding voor nader onderzoek naar de relatie tussen reflecteren en leren bij zowel ervaren docenten als bij docenten in opleiding.

Een derde onderzoeksonderwerp betreft de onderwijsopvattingen en met name de verschillen in profielen die gevonden zijn voor ervaren docenten (drie profielen:

een gecombineerd leerling- en vakgericht profiel, een leerlinggericht profiel, en een vakgericht profiel) en voor docenten in opleiding (twee profielen: een 'hoog' gecombineerd leerling- en vakgericht profiel, en een 'lager' gecombineerd leerling- en vakgericht profiel). Nader onderzoek dient uit te wijzen of deze gecombineerde opvattingen van docenten in opleiding stabiel blijven over de tijd, met nieuwe docenten in opleiding en in longitudinale studies met dezelfde docenten. Met betrekking tot de verschillen in sterkte in opvattingen, is het interessant te onderzoeken of er een verband is met al dan niet in het beroep blijven.

Ten slotte zijn er uiteraard studies nodig die bij voorkeur longitudinaal zijn om de effecten na te gaan van de hierboven gedane aanbevelingen op het gebied van selectie, de initiële lerarenopleiding en scholen, en ook om deze zo nodig weer bij te stellen. Met als uiteindelijk doel lerende docenten die goed onderwijs geven zodat alle leerlingen goed kunnen leren en presteren.

# Curriculum vitae

Siebrich de Vries (1962) heeft na haar gymnasium-$\alpha$ aan het Carolus Clusius College te Zwolle Franse taal- en letterkunde en Toegepaste taalkunde gestudeerd aan de Rijksuniversiteit Groningen. Van 1987 tot 1995 was ze werkzaam als docent Frans op verschillende scholen voor voortgezet en hoger beroepsonderwijs in de noordelijke regio. In 1991 begon ze als vakdidacticus Frans bij de Faculteit der Letteren aan de Rijksuniversiteit Groningen, waarna ze in 1998 bij het toen nieuw opgerichte UCLO de coördinatie van de nascholing voor docenten voortgezet onderwijs op zich nam. In 2004 ontstond het UOCG en werd ze afdelingshoofd scholing & professionalisering voortgezet en hoger onderwijs. Toen zich in 2006 een dieptepilot Academische Scholen aandiende, is ze het flankerend onderzoek voor de School of Education gaan uitvoeren. Vanaf 2009 heeft ze zich beziggehouden met onderhavig promotie-onderzoek, en is ze bij de inmiddels bij de Faculteit GMW ondergebrachte Universitaire Lerarenopleiding werkzaam als lerarenopleider en sinds kort ook als projectleider 'Professionele leergemeenschappen'.

# Publications

## Peer reviewed publications:

De Vries, S., Beijaard, D. & Buitink, J. (2008). Learning in the context of 'co-creation of educational practices'. In J. Ax, & P. Ponte (Eds.), *Critiquing Praxis* (pp. 163-179). Rotterdam: Sense Publishers.

De Vries, S., Van de Grift, W. J. C. M., & Jansen, E. P. W. A. (2013). Teachers' beliefs and continuing professional development. *Journal of Educational Administration, 51*(2), 213-231.

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De Vries, S., Van de Grift, W. J. C. M., & Jansen, E. P. W. A. (2014). How teachers beliefs about learning and teaching relate to their continuing professional development. *Teachers and Teaching: Theory and Practice, 20*(3).

## Manuscripts submitted for publication:

De Vries, S., Jansen, E. P. W. A., Helms-Lorenz, M., & Van de Grift, W. J. C. M. (under review). Student teachers' participation in learning activities and their effective teaching behavior.

De Vries, S., Jansen, E. P. W. A., Helms-Lorenz, M., & Van de Grift, W. J. C. M. (under review). Student teachers' beliefs about learning and teaching and their participation in career-long learning activities.

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Toen ik in 2009 het idee had voor een vragenlijst om de professionele activiteiten van docenten in kaart te brengen, was Elma Dijkstra geïnteresseerd in een masterscriptie Onderwijskunde op dit gebied, en, naast dat we een gezellige tijd hadden, hebben we een pilot uitgevoerd op het Zernike College te Groningen. Dit friste m'n kwantitatieve onderzoekskennis op, en het legde tevens inhoudelijk de basis voor de vragenlijst die in 2010 met veel inzet van Roel Fleurke, Carla Griep, Geke Schuurman en Sytze Ypma is afgenomen bij de docenten van de vier School of Education-scholen: Stad en Esch in Meppel, Dr. Nassau College in Assen, De Borgen in Leek en Piter Jelles in Leeuwarden.

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