Individual teacher learning in a context of collaboration in teams

Meirink, J.A.

Chapter 1

Ann, digital log number 1

My first learning experience started off during our first team meeting. Just before the meeting I had marked a test of one of my classes who had got really low grades. [...] Something had to change in that class. My first thought was: the students don't learn, they underestimate the subject matter. [...] My goal was to control students' homework very strictly in future and to confront them with the fact that they did not study well since I could point out in their textbooks and assignments exactly where they could have found the corrects answers to the test questions. [...] During the meeting I realized that it would be worthwhile to examine first why students caught on to the subject matter so badly, because it is a rather quick conclusion to say that they just do not work hard enough. [...] In this meeting, colleagues often mentioned motivation and positive feedback as the key to activate students' learning. I realized that this was the problem in my own teaching practice. I formed the intention to not only control homework but mainly to compliment students in order to improve the atmosphere and work climate. So far, I do not have new grades to prove that this approach is working, but the atmosphere has improved and I notice that students are indeed more motivated when they receive a compliment. Actually, I knew this for years, but the consultation with colleagues has opened my eyes and stimulated me to use this knowledge in my teaching practice.

Iris, digital log number 3

I went to Eric in his class as I had a question. It was so much fun that I decided to stay (just by coincidence, I had a free hour). [...] The students had to individually show Eric what they had done for the drawing teacher. When a student had not done the work, it was immediately agreed that it had to be done by the next class. This was done with a joke, but thereafter order and clarity and he wants immediate explanation from the students. The students who did do the work were asked to explain what the assignment entailed and how they interpreted it. The rest of the class watches and discusses as well. [...] Good atmosphere, involvement, and clarity. I left the classroom with the idea that I should have attention for every student, good or bad but in a positive manner, because then you can do almost anything. My learning experience is that you can confront students with their failures and also compliment them with their product as long as you do that with humor and clarity. And the students learn from each other: how things should be done and what is expected of them.

Jeff, digital log number 6

Three weeks ago, we were in an Education Group meeting to prepare the first study afternoon. [...] One of my colleagues introduced the concept 'visible learning' that requires a high level of action for both the teacher and the students during a lesson. [...] In a short enumeration of possible teaching methods for 'visible learning,' my colleague mentioned the 'half-time conversation'. The teacher asks small groups of students to briefly talk with him or her about what has been done during the past few lessons. The students can learn from each other in such a manner and are, of course, forced to put aspects of the subject matter into words. [...] In the two weeks following this preparatory meeting, I used the half-time conversations in four lessons and they really worked! Of course, you have to ask the right questions. [...] A pleasant side effect is that you can pay more personal attention to the students in a serious environment.

Susan, digital log number 1

This year I wasn't very pleased with my own method of controlling students' homework. I want students to do their homework as asked, but I don't want to use punishment exercises. I would rather motivate them to do their homework in a different manner. In the second term of this school year, I started off with a different method. I got the idea by visiting schools in France and observing a teacher at one school. This teacher pulled out a number out of a bag at the start of each lesson and asked the student whose number on the student list corresponded to this number, to write his or her homework on the blackboard. [...] I don't control students' homework anymore, but I let chance decide which student has to write down his or her answer to a homework assignment on the blackboard. [...] Students think it is important to have their homework in order when it

Chapter 1
General introduction

This thesis reports on studies aimed at examining individual teacher learning in a context of collaboration in interdisciplinary teams in the workplace. We explored *how* and *what* teachers learn when they collaborate with colleagues with different subject matter backgrounds, and how group and organizational characteristics influence this learning. This first chapter deals with the context, the main underlying theoretical perspectives, the research questions, and the design of the study. Finally, we provide a short description of the studies as presented in Chapters 2 to 5.

1.1 Background to the study

Lifelong learning has become a well-known concept in our present knowledge-based society. Professionals from various career fields are required to pay constant and close attention to latest developments, to anticipate emerging technologies, to increase their competences, and to advance in their careers (Alejandro, 2001; Van Veen, 2007). In order to support and optimize professionals' continuous development it is important to comprehend how professionals learn. Consequently, teacher learning has become an important research topic in the field of education (e.g., Hammerness, Darling-Hammond, Bransford, Berliner, Cochran-Smith, McDonald, & Zeichner, 2005; Putnam & Borko, 1997; Richardson & Placier, 2001; Wilson & Berne, 1999). Many studies have focussed on student teacher learning or on in-service teacher learning in formal settings 'outside' teaching practice. Formal programs can be divided into more traditional training programs in which an expert tells teachers, for example, how to implement a new instructional method, and programs in which teachers organize and plan their own development. For a long time these programs took place outside schools, for example, in summer courses or at conferences (Grossman, Wineburg, & Woolworth, 2001; Richardson & Placier, 2001). In recent years, a growing interest in stimulating teacher professional development in the workplace has become apparent (e.g., Kwakman, 2003). Situating teacher professional development in the workplace can foster instant experimentation with newly acquired knowledge and skills in the teachers' own teaching practice. However, research into how teachers' learning processes occur in the workplace is incomplete. Knowledge of how and when teacher learning takes place in the workplace is of great importance for the implementation of future educational reforms. Educational reforms call for changes in teachers' teaching methods and in their ways of thinking about student learning. Gaining more insight

into teacher learning in the workplace can help in supporting and facilitating teachers in the implementation of future reforms in their own practices.

In 2003 a large Dutch research project was initiated in which 100 experienced secondary education teachers were investigated over a period of one year; the aim was to develop an empirically funded theoretical model of teacher learning in the workplace (Bakkenes, Hoekstra, Meirink, & Zwart, 2004). Teacher learning in the workplace was examined in three different environments: (1) collaboration in interdisciplinary teams, (2) reciprocal peer coaching, and (3) an informal learning context in which there was no systematic support for teacher professional development. These three environments were chosen to attain a broad and typical view of experienced teacher learning in the workplace. In this thesis we report on the research project in which individual teacher learning was examined in the first-mentioned learning environment: collaboration in interdisciplinary teams.

1.1.1 Teacher learning in a context of collaboration in interdisciplinary teams

Working in teams is becoming more and more common in school organizations. It is widely acknowledged that collaboration between professionals can be a powerful way of learning. From previous research it is known that teachers themselves consider interaction with colleagues useful in their own development as professionals (Johnson, 2003; Kwakman, 1999; Lohman, 2005). Hammerness, et al. (2005) argue that teacher learning can take place along two dimensions: an efficiency dimension and an innovative dimension. When these dimensions are related to teacher collaboration, collaboration in the first dimension can be aimed at making teachers' existing teaching routines more efficient and elaborate. This type of collaboration and learning is not difficult to achieve. Collaboration aimed at innovative teacher learning, on the other hand, involves giving up old routines and transforming prior beliefs, and is much more complicated. Despite this, for teachers to be professionals, it is important that they have the skills and a will to continuously evaluate and change their current practice in collaboration with colleagues. When teachers have had positive experiences of developing and changing their teaching in collaborative contexts, it is to be expected that they will ask for feedback from colleagues more often in future.

In studies of teacher learning in collaboration, there has been a strong focus on the conditions under which collaboration is most effective for the professional development of teachers (Schwarz McCotter, 2001; Little, 1990; Borko, Mayfield, Marion, Flexer, & Cumbo, 1997). For example, shared goals and the creation of high levels of interdependence between teachers are assumed to stimulate teacher learning in collaboration. However, research addressing how

teachers actually learn within settings aimed at innovation and studies in which teacher learning in collaborative settings is described in detail are lacking (Hasweh, 2003; Wilson & Berne, 1999). The research project presented in this thesis was aimed at providing an understanding of what, how, and under what conditions teachers learn within a context of collaboration in interdisciplinary teams, by making such detailed descriptions. These descriptions might assist optimization of the conditions for teacher professional development in the workplace by policymakers, school principals, and coaches in teacher professional development trajectories. They may also be useful for teachers themselves as they can use this knowledge in becoming more conscious of ways in which they can continuously change and innovate their teaching.

1.1.2 Fostering active and self-regulated student learning as a context for learning

The teachers which were investigated in this research project all collaborated in teams on a topic related to 'stimulating active and self-regulated learning of students'. In order to prepare students for lifelong learning, a large educational reform was implemented in Dutch upper secondary education in 1998. In higher education, students are supposed to be able to regulate their own learning. In secondary education, teachers are, therefore, encouraged to use a pedagogical approach which focuses, in addition to teaching subject matter, more on fostering active and self-regulated student learning. Teachers, while remaining experts in their specific school subjects, need to expand their repertoire and become coaches of students' learning processes also, and stimulate students to learn how to become responsible for their own learning processes. For a successful implementation of this reform it is important that teachers endorse a student-oriented approach to teaching and learning. Such an approach stimulates students to take responsibility for their own learning processes and the regulation of these, and also stimulates them to work and learn together (see, among others, Bolhuis & Voeten, 2004; Oolbekkink-Marchand, Van Driel, & Verloop, 2006a; Waeytens, Lens, & Vandenberghe, 2002). As for most experienced teachers these reforms require changes in their ways of thinking about teaching and student learning and their teaching behavior (i.e., learning along an innovative dimension), we reasoned that this would be a good context to investigate teacher learning in a context of collaboration in teams in the workplace.

1.2 Theoretical framework

1.2.1 Characterization of collaboration in interdisciplinary teams

We examined teams that included teachers of different subjects. Given that interdisciplinary collaboration is not common practice in Dutch secondary

education, we assumed that this type of collaboration could create many new learning opportunities for teachers. Most teachers only work together with colleagues from the same subject department (Van Wessum, 1997; Witziers, Sleegers, & Imants, 1999). We reasoned that interdisciplinary collaboration can foster teachers' acquaintance with a broader variety of ideas and teaching methods as teachers from different subject matter departments to some extent use diverse teaching methods. These methods may be based on different ways of thinking about how students learn and may be related to characteristics of the subject matter content. This can stimulate teachers to reflect on their own practice and, subsequently, to experiment with the (adjusted) methods of colleagues to alter and elaborate on their own practical knowledge of teaching. Instead of being provided with formal theoretical knowledge of teaching developed outside actual teaching, teachers who participate in such interdisciplinary settings are stimulated to develop and adjust their knowledge of their own teaching practices (Verloop, Van Driel, & Meijer, 2001). The collaboration in these teams can best be characterized using images of 'knowledge *in* practice' and 'knowledge *of* practice' (Cochran-Smith & Lytle, 1999, p. 250-262). Cochran-Smith and Lytle use three images that represent the three most prominent conceptions of teacher professional development: knowledge *for* practice; knowledge *in* practice; and knowledge *of* practice. These three images of knowledge are related to specific forms of teacher learning and have led to different ideas about how teacher professional development should be fostered in order to change and improve education.

In the 'knowledge *for* practice' image, it is assumed that researchers produce formal knowledge and theory *for* teachers which can be used to improve practice. In this perspective, it is argued that acquiring more knowledge leads to a better teaching practice. In teacher professional development programs which are based on this conception of teacher learning, the focus is on acquiring new or additional knowledge and skills related to a specific content area.

In the image of 'knowledge *in* practice', teachers' practical knowledge takes a central position. From this perspective, "it is assumed that teachers learn when they have opportunities to probe the knowledge embedded in the work of expert teachers and/or to deepen their own knowledge and expertise as makers of wise judgments and designers of rich learning interactions in the classrooms" (p.250). In their everyday teaching practice, teachers are continuously confronted with challenging situations which require an almost immediate appropriate reaction. Through 'considered and deliberative reflection' they acquire the knowledge they need to teach well. Professional development programs founded on this image of teacher learning aim at stimulating teachers to become more conscious of their own assumptions, and their own ways of reasoning and decision-making.

The image of 'knowledge *of* practice' does not distinguish formal knowledge from practical knowledge. In the related conception of teacher learning, it is assumed that the knowledge teachers need to teach well can be derived from intentional investigation of own teaching practices in combination with using knowledge produced by others to interpret own practices. In addition, teachers are assumed to learn in collaboration with colleagues in inquiry communities or networks. These communities can consist of novice and expert teachers, facilitators, and researchers. An important notion is that all participants are considered fellow learners and researchers who collaborate in changing their teaching practices, schools, and societies.

The teacher teams participating in this study were stimulated to think collectively of ways to foster active and self-regulated student learning, and to experiment with new methods in their own teaching practice. We expected that exchanging ideas and experiences with colleagues would encourage teachers to critically examine and reflect on their own practices; collaboratively examining and reflecting on their individual practices might result in changes in individual teachers' ways of thinking about student learning or in changes in their teaching practices.

1.2.2 Conceptualization of teacher learning

Based on the arguments mentioned in the previous section, we reasoned that teacher learning takes place in teachers' daily teaching practice and in interaction with peers. This way of thinking is based on a 'situative' perspective on cognition and learning (Putnam & Borko, 2000). From this perspective it can be drawn that teacher learning cannot be separated from the context in which it takes place. 'How a person learns a particular set of knowledge and skills, and the situation in which a persons learns, become a fundamental part of what is learned' (p. 4). Teacher learning is considered to be intertwined with ongoing teaching practices and should, therefore, be grounded in this practice. Also, the importance of interaction with others (colleagues, students, etc.) in both what is learned and how learning occurs is highlighted in this perspective on learning (cf. Salomon & Perkins, 1998). It is argued that teachers can participate in discourse communities which can stimulate them to critically reflect on their current practices and support them in experimenting with alternative teaching methods.

In order to investigate teacher learning in a context of collaboration in interdisciplinary teams, we considered 'teacher learning' to be *an ongoing work-related process of undertaking activities that leads to a change in cognition or behavior, or both*. This description is derived mainly from an acquisition perspective, and partially from a participation perspective on learning (Sfard,

1998). Regarding the acquisition metaphor of learning, we regarded learning primarily as a continuous active individual process of personal construction of cognition or behavior, or both. In order to examine learning from this perspective, changes of cognition or behavior, or both, can be considered evidence of learning. In addition, we expected teachers to continuously change and adjust their knowledge and skills in order to align with latest developments and demands from society. Furthermore, based on the participation metaphor of learning, we endorsed that "learning and learning activities should not be considered separate from the context in which they take place" (Sfard, 1998, p.6). Therefore, the team and school environment was taken into account as well. We aimed to include *what* teachers learn by looking mainly at changes in cognition, and *how* teachers learn by examining teachers' learning activities that resulted in such changes in cognition. The *environment* of teacher learning was also included: we examined how teachers start up and develop collaboration in interdisciplinary teams and the influence of group and organizational variables on how and what teachers learn in a context of collaboration in teams.

With *learning activities* we refer to individual activities that teachers undertake both in and outside the workplace, and which they consider relevant to their own development in fostering active and self-regulated student learning. In particular, *changes in cognition* (knowledge, beliefs, attitudes, emotions) were examined because they can lead to changes in teaching practice (Fishman, Marx, Best, & Tal, 2003). Successful implementation of the educational reform requires teacher acceptance and adherence to the principles of 'active and self-regulated student learning' (Oolbekkink-Marchand, et al., 2006a). In other words, changes in teachers' beliefs are needed to enable them to focus on the stimulation of their students' active and self-regulated learning in addition to teaching their subject matter. Changing teacher beliefs, however, is considered to be a difficult task. For instance, Pajares (1992) concludes that "teachers' beliefs generally are not easy to change even when, based on opposing evidence, it is logical or necessary for them to do so" (p. 317). Student teachers tend to use new information to confirm and strengthen rather than change their current beliefs (Tillema, 1998). Tillema and Knol (1997) argued that in order to change student teachers' beliefs, it is important to take their existing beliefs as a starting point. Subsequent to recognizing one's beliefs in relation to new ideas, investigation and experimentation are necessary for student teachers to decide if new ideas are plausible. Based on such experimentation, student teachers can decide to change and reconstruct their existing beliefs. In this study, we focused specifically on belief changes in experienced teachers who have been confronted with many educational reforms in recent years. We examined how and why the beliefs of some experienced teachers

change, but not those of other teachers. Additional insight into the reasons for and details of changes in beliefs in experienced teachers might be of help in supporting these teachers in implementing future educational reforms.

In addition to examining changes in beliefs, we also examined teachers' preferences for learning activities and changes in these preferences. Participants collaborated with colleagues in interdisciplinary teams, which was a new way of professional development for these teachers. They also collaborated on a new pedagogical approach, namely, 'fostering active and self-regulated student learning'. In such a context, it might be expected that teachers would change not merely their knowledge and skills with regard to teaching and student learning, but also their own (preferences for) ways of learning. Exploring teachers' preferences for learning activities and changes in these preferences can be of use in designing and optimizing future teacher professional development.

From the participation metaphor of learning we derived that teacher learning cannot be separated from the context in which it takes place. Therefore, *teachers' work environment* was taken into account.

In the four studies presented in this thesis we examined individual teacher learning in a context of collaboration in interdisciplinary teams using the various perspectives as discussed above, and, therefore, different elements of teacher learning are highlighted and combined. For the studies presented in this thesis, we formulated the following research questions:

1) What learning activities do teachers undertake in collaboration in interdisciplinary teams and what do they report to learn from it during a period of one year?
2) How are learning activities that teachers undertake in a context of collaboration in interdisciplinary teams related to changes in their beliefs with respect to the topic 'active and self-regulated student learning' during a period of one year?
3) How are learning activities that teachers undertake in a context of collaboration in interdisciplinary teams related to changes in their preferences for learning activities during a period of one year?
4) How do teachers collaborate in interdisciplinary teams and how does this relate to teacher learning with respect to the topic 'active and self-regulated student learning'?

1.3 Design of the study

We examined individual teacher learning in a context of collaboration in interdisciplinary teams. The teachers collaborated on a specific topic related to fostering active and self-regulated student learning. Five interdisciplinary teams

(ranging in size from four to nine teachers) in five different schools were examined for a period of one year. In total, thirty-four teachers participated. All five interdisciplinary teams began working together at the start of this study. Both quantitative and qualitative data collection instruments were used to obtain detailed information on *what* and *how* teachers learned during the year they were investigated. To collect data on *what* teachers learned, we asked them to complete a questionnaire on their beliefs about teaching and learning. This questionnaire was administered at the beginning and end of the year in order to determine possible changes in these beliefs. To obtain information on *how* teachers learn, we mapped individual learning activities teachers were engaged in using their reports on six learning experiences in digital logs. The teachers also completed a questionnaire on their preferences for learning activities. Like the questionnaire on teachers' beliefs, this questionnaire was administered both at the beginning and end of this study in order to examine whether teachers changed their preferences for ways of learning as a result of participating in an interdisciplinary team for the period of one year. In addition, team meetings were observed to examine the collaboration in teams. The teachers also completed questionnaires on how they perceived the team and school in which they worked; this was to further characterize the interdisciplinary teams. With regard to teachers' perception of their teams, they completed a questionnaire in which they had to evaluate elements of the team they had participated in, such as group cohesion. On a more general level, a questionnaire aimed at measuring teachers' views on school organizational variables was administered. We expected that knowledge of the interconnectedness of these data sources might enable a better understanding of individual teacher learning in a context of collaboration in teams in the workplace.

1.4 Outline

In Chapters 2 to 5, four studies are presented which were all aimed at gaining a more comprehensive understanding of how teacher learning takes place in a context of collaboration in interdisciplinary teams.

Chapter 2 addresses the first research question. In this chapter, an in-depth qualitative study *(study 1)* is described, focusing on reported learning activities and outcomes with respect to active and self-regulated student learning resulting from collaboration in teams. For this study, we conducted in-depth interviews with one or two teachers from each team, in total six teachers, after each meeting in order to gain insight into what they learned from that meeting and which learning activities during the team meeting caused this learning. In addition to these interviews, teachers' digital logs were analyzed to gain insight into what and how these teachers learned from collaboration with colleagues. The results of

both the interviews and the digital logs were combined in order to examine what and how teachers learn from collaboration in teams during a period of one year.

Chapter 3 addresses the second research question and presents a study *(study 2)* in which individual teacher learning was examined within a broader scope. For a period of one year, thirty-four teachers reported on at least six learning experiences in digital logs which in their view were important for their own professional development with respect to fostering active and self-regulated student learning. In addition, the teachers completed a questionnaire on their beliefs about teaching and learning at the beginning and the end of the year. The learning activities reported in these logs were related to changes that occurred in the teachers' beliefs about teaching and learning between the first and second time they filled in the questionnaire, in order to examine connections between how and what individual teachers learn in the workplace.

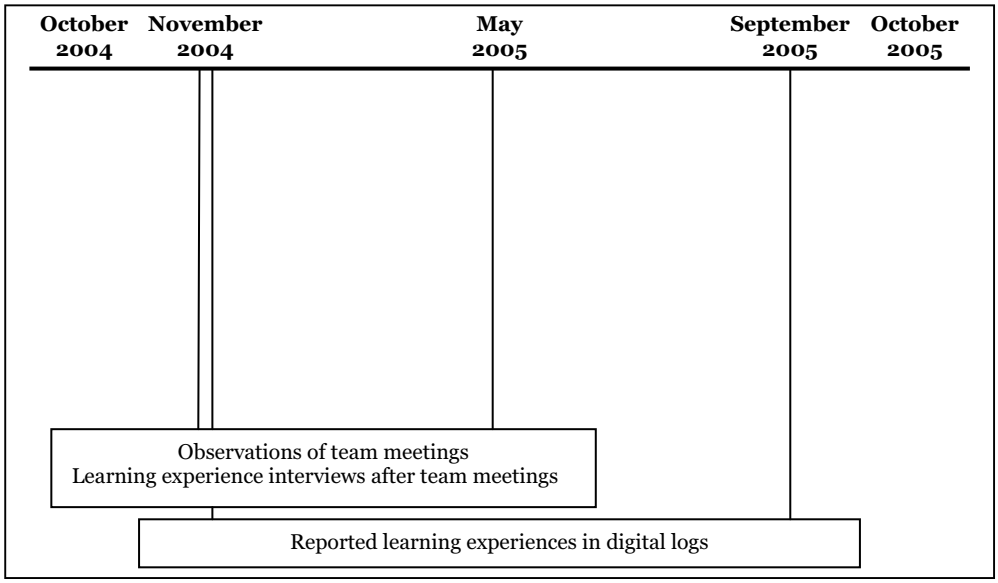
Chapter 4 deals with the third research question and describes a study *(study 3)* in which changes in teachers' preferences for ways of learning were examined. The thirty-four participating teachers completed a questionnaire on their preferences at the beginning and the end of the year. To explain why some teachers' preferences for learning activities changed while those of others remained the same, we examined the teachers' learning activities in the workplace reported in their digital logs.

C*hapter 5* addresses the fourth research question on the characterization of collaboration in the five interdisciplinary teams, and how this collaboration relates to teacher learning *(study 4)*. We explored how teachers started up and developed collaboration in interdisciplinary teams, and how this related to changes in teachers' beliefs with respect to the topic 'active and self-regulated student learning'. Additionally, the influence of group and organizational characteristics, such as group cohesion, shared vision, and decision-making, on collaboration and teacher learning in interdisciplinary teams was explored.

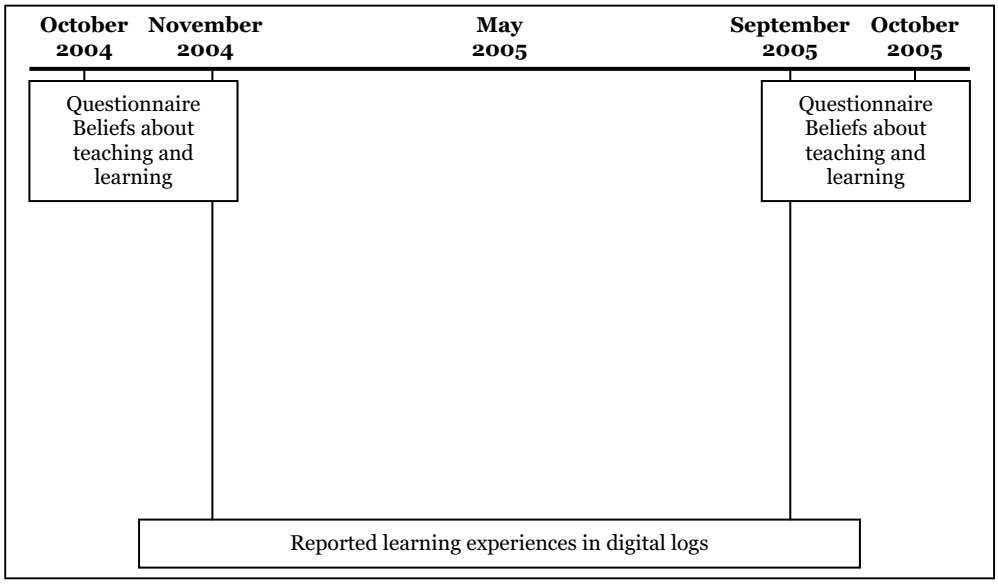
In *Chapter 6,* we summarize the main findings and conclusions of the four studies. Limitations of the studies are also discussed. We conclude with a discussion of the implications of the findings and suggestions for future research on teacher learning in the workplace, and particularly in the context of collaboration in interdisciplinary teams.

On the following pages we provide figures of the data collection of each of the four studies presented in chapter 2 to 5 separately, and one figure for the total data collection of this research project.

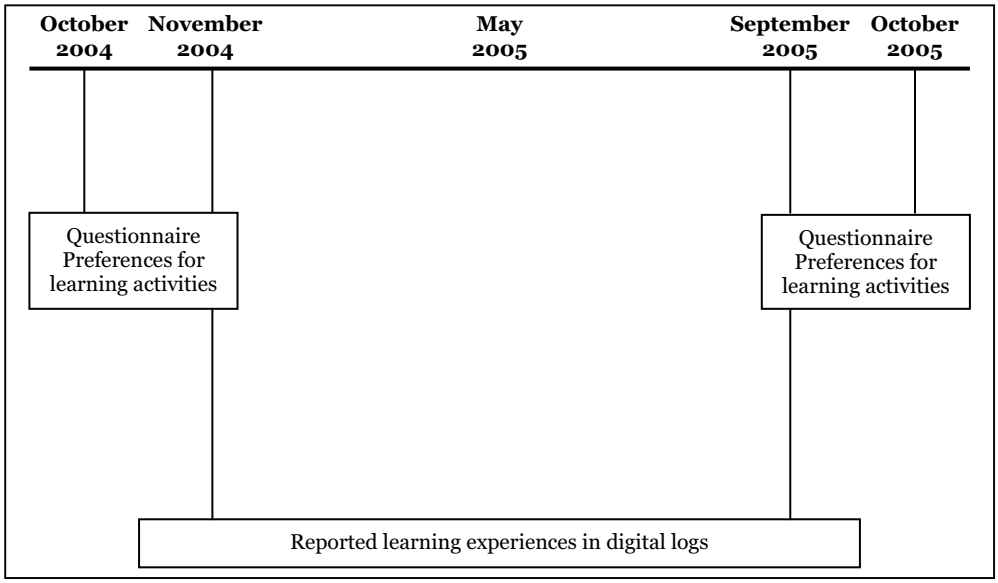
Study 1: What learning activities do teachers undertake in collaboration in interdisciplinary teams and what do they report to learn from it during a period of one year?



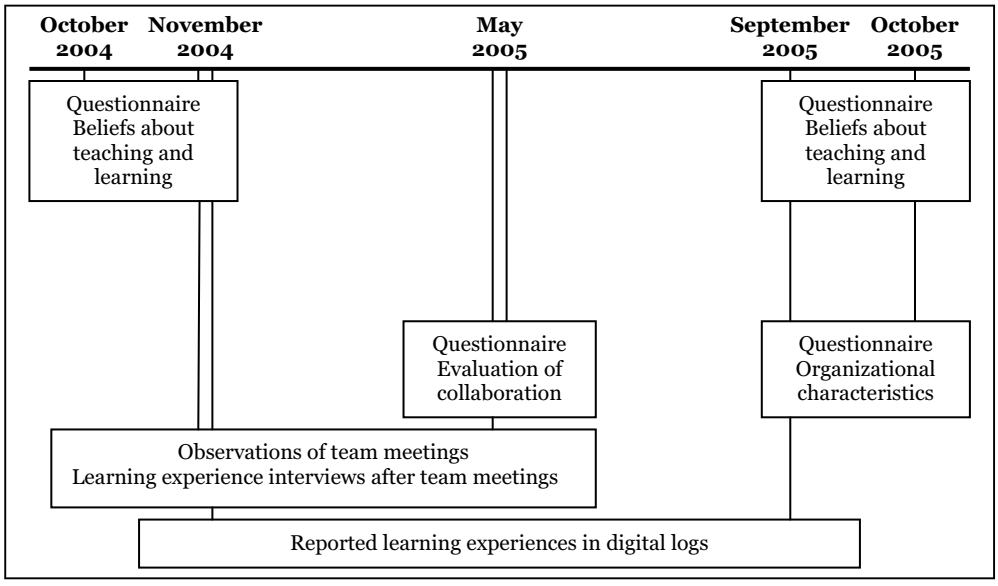
Study 2: How are learning activities that teachers undertake in a context of collaboration in interdisciplinary teams related to changes in their beliefs with respect to the topic 'active and self-regulated student learning' during a period of one year?



Study 3: How are learning activities that teachers undertake in a context of collaboration in interdisciplinary teams related to changes in their preferences for learning activities during a period of one year?



Study 4: How do teachers collaborate in interdisciplinary teams and how does this relate to teacher learning with respect to the topic 'active and self-regulated student learning'?



Total data collection