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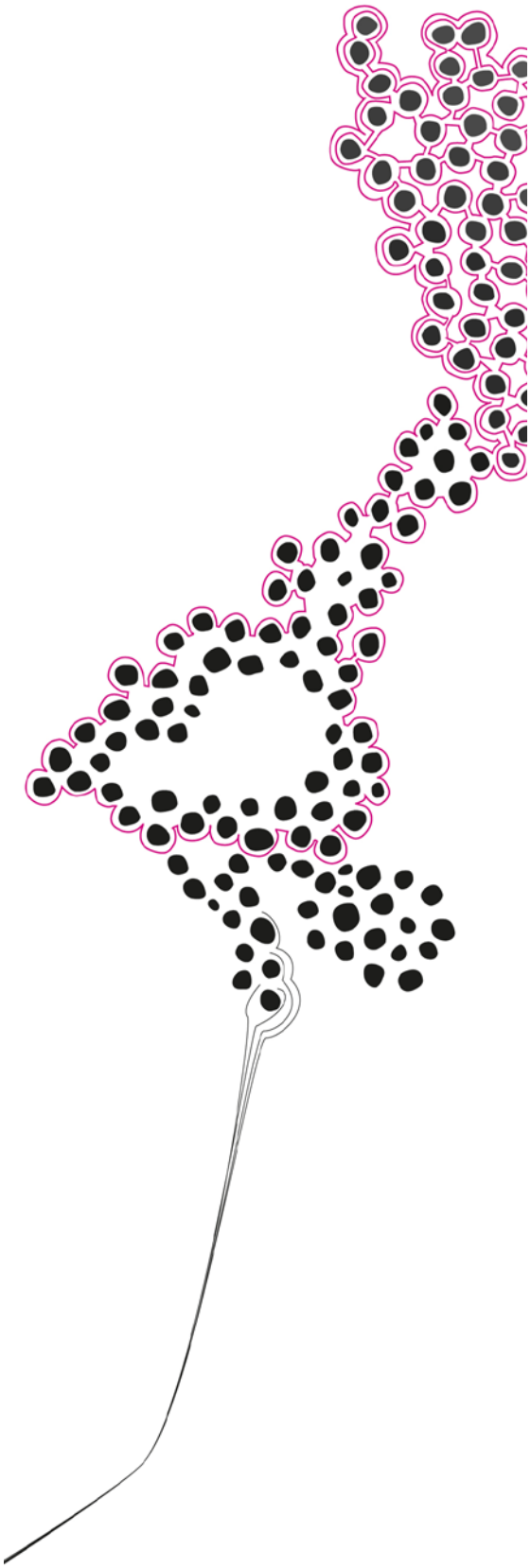

LEARNING TO TEACH

STUDENT TEACHERS' LEARNING AND REGULATION ACTIVITIES AND THEIR PERCEPTION OF A DUAL LEARNING ENVIRONMENT

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Abstract

Since the last decade, learning to teach is increasingly organised in dual learning programmes, which is a combination of a teacher education institute and a practice school. To extend knowledge of how student teachers learn to teach, this thesis researches learning and regulation activities used in a dual learning environment (teacher education institute, practice school and the combination of both) and how these contexts are perceived.

Data for the study on learning and regulation activities was gathered with the Structured Learning Report on two cohorts of 172 student teachers and were analysed with a Chi-square analysis. For each learning environment a typical learning character could be identified. At the practice school student teachers seem to learn rather practical by performing activities and trying them again, also in different situations. The reflection on their work is guided by rules of thumb or theory of practice. At the institute, student teachers apparently learn in a more theoretical manner. Their main goal is to get information. They monitor their learning by using new information and reflect by using factual and procedural knowledge. In the combination of both contexts student teachers' learning is very self-reflective: they reflect on their experiences, learning identity and teaching practice. Furthermore they are aware of their behaviour.

To analyse student teachers' perception of supervision and learning at the teacher education institute and at the practice school, a cohort of 82 student teachers answered a questionnaire. A factor analysis and an additional paired samples *t*-test on the perception of learning and supervision at school and teacher education institute verified that student teachers perceive the contexts differently. Reasons for this difference in perception could be the supervisors' definition of their role and their theoretical and practical knowledge.

Introduction

The concept of learning has traditionally been related to formal education at school, university or other education institutes (Eraut, 2004). The interest in informal learning emerged in the early 1990s (Tynjälä, 2008). The alteration in attention can be explained by the rapidly changing information- and communications technology, that asks for lifelong development not only from organizations competing in the economy, but also from the society itself. In the context of learning, the learning society is in the focus of interest because not only the concept of learning has transformed also the profession of teaching has undergone a lot of changes throughout the ages (see e.g., Hagger, Burn, Mutton, & Brindley, 2008). Being a teacher has become increasingly challenging: students have all kinds of backgrounds, information is free accessible for everyone and the society has a critical attitude towards education and teaching (Vermunt & Endedijk, 2011). Teachers have to adapt to those changes. Cochran-Smith and Zeichner (2005) state that to be able to support student teachers in their adaption, teacher education and teacher learning are important factors.

During the last decade an important shift in teacher education has taken place. In the past, traditional teacher education was given frame as university-based education programmes that separated the university from student teachers' future workplace school (Hobson, Malderez, Tracey, Giannaki, Pell, & Tomlinson, 2008). More recently, the employment of dual learning environment is augmenting. These programmes are designed as *dual learning environments*: a combination of a formal institutional context and an informal practice school context where learning to teach takes place at the same time (Endedijk, Vermunt, Verloop, & Brekelmans, 2011). Learning in theory and practice has been identified to be a precondition for successful learning (Hobson et al., 2008; Korthagen, Kessels, Koster, Lagerwerf, & Wubbels, 2001; Korthagen, Loughran, & Russell, 2006, Korthagen, 2011; Hascher, Cocard, & Moser, 2004). This thesis therefore examines how student teachers learn to teach in a dual learning environment and thereby give indications about the effectiveness of the dual learning environment.

Teaching itself and learning to teach have been recognised to be complex processes (e.g., Hammerness, Darling-Hammond, Bransford, Berliner, Cochran-Smith, McDonald, & Zeichner, 2005). Hammerness et al. (2005) claim that if student teachers are not able to master the complexities they are faced with, they will have difficulties to become a professional teacher. Student teachers have their own ways of managing this complexity which manifests in differences in learning to teach (Oosterheert, Vermunt, & Veenstra, 2002; Donche & Van Petegem, 2009; Hagger et al., 2008).

While learning to teach, student teachers exercise learning and regulation activities. As there is a variance of different definitions of learning and regulation activities the definitions used in this bachelor thesis are given subsequently. Vermunt and Endedijk (2011) have defined learning activities "as observable, overt activities [….] that teachers use to learn something" (p. 294). Likewise, regulation activities are described as being aimed at learning and take place on a physical or mental level, exerting control on cognition, emotion or action (Endedijk, Brekelmans, Vermunt, Den Brok, & Verloop, 2007). Research that has been done on learning and regulation activities employed in either a formal or informal learning environment has shown a difference in use in the two learning environments (e.g., Bakkenes, Vermunt, & Wubbels, 2010; Meirink, Meijer, & Verloop, 2007; Mansvelder-Longayroux, Verloop, Beijaard, & Vermunt, 2007; Endedijk et al., 2011). A determination of activities used in a dual learning environment has not taken place yet. The use of formal and informal activities would argue in favour successful learning and thus also for the effectiveness of the dual learning environment.

The effectiveness of a dual learning environment is furthermore determined by its' perception (Entwistle, 1991). It is known that *different student teacher types* show a dissimilar perception of the *same learning environment* (Oosterheert et al., 2002). However, it is unfamiliar if student teachers have a discriminative perception of different types of learning environments. Therefore, identifying how student teachers perceive a learning environment could account for reasons why student teachers still experience a gap between what they learn at the education institute and at school even when learning in a dual learning environment. Even though a dual learning environment combines learning in formal and informal environments, research has revealed that new teachers still experience a theory-practice gap (e.g., Hobson et al., 2008; Cochran-Smith, 2005). Identifying reasons for difference in

perception could lead to suggestions how the problem of the theory-practice gap could be solved. With a closing of the gap student teachers will probably gain and use theoretical and practical insights. This will most likely improve their teaching.

To conclude, the dual learning environment is a relatively new phenomenon, therefore little is known about the effectiveness of this learning environment. To make successful learning true, it should take place in theory and practice (e.g., Hobson et al., 2008; Korthagen, 2011). As has been pointed out, traditional teacher education programmes separated theory from practice, which evoked the theory-practice gap (Hobson et al., 2008). A dual learning environment combines learning in a formal and informal learning environment. It therefore responds to the criticism of separation, as it combines and values theory and practice. It seemingly satisfies the requirements of successful learning. Still, student teachers experience a gap between theory and practice. Korthagen (2011) puts forward that theory plays only a minor role in the thinking of teachers. Hagger et al. (2008) have even discovered that theory is regarded as irrelevant in the context of teacher education.

For the reasons mentioned above it is expected that the use and the perception of the combination of theory and practice influences the effectiveness if this learning environment. This thesis is therefore going to examine the learning and regulation activities student teachers employ while learning to teach in and the perception of this learning environment.

Literature review

The aim of this review is to examine what is already known about student teachers learning to teach in a dual learning environment and to detect gaps in the state of research. Therefore, five topics were chosen: (1) the complexity of learning to teach and the individual patterns of this activity, (2) the dual learning environment, (3) the examination of learning and (4) regulation activities. The last important aspect to be treated is (5) the perception of the learning environment.

Learning to teach

To become a professional, student teachers should develop into an “adaptive expert” (Hammerness et al., 2005). An adaptive expert is described as being able to balance efficiency and innovation in their teaching. They employ diverse teaching activities effortlessly, develop new ones and at the same time meet their pupils’ needs. However, research has proven that the complex process of learning to teach can hinder the development of becoming an adaptive expert in teaching (Hammerness et al., 2005).

Learning to teach faces three challenges making it a complex activity, identified by Hammerness et al. (2005). The first source of complexity, the *apprenticeship of observation*, refers to student teachers’ preconditions about learning to teach, that are based on what they have experienced as students themselves. The preconceptions make it difficult for student teachers to generate profound comprehension of the concepts on learning to teach (Kennedy, Darling-Hammond, & Sykes, 1999). As a result, student teachers become conservative in their teaching and they tend to replicate what they have seen instead of developing their own teaching style (Darling-Hammond, 2006). To overcome the conservatism, student teachers have to realise that teaching can take place differently than how they have learned during their teacher education (Hammerness et al., 2005).

The second source, the *challenge of enactment*, implies that acting like a teacher involves the exercise of different tasks at the same time while having to meet the needs of a variety of learners (Hammerness et al., 2005). At the beginning of their education the vision student teachers have of their teaching is often too advanced compared to their ability to enact it (Liston, Whitcomb, & Borko, 2006). To conclude, the challenge of enactment leads to student teachers having problems to put their ideas into action (Hammerness et al., 2005).

At last to be presented is the *nature of teaching*. The diversity of pupils leads to different goals that ask for the use of different kinds of knowledge (Lortie, 1975). However, to make successful learning true, student teachers do not only have to use the required knowledge but compare (Zanting, Verloop, & Vermunt, 2001) and integrate it as well (Borger & Tillema 1996; Darling-Hammond, 1999). This is considered to be difficult because student teachers struggle to figure out what their own

teaching needs are and at the same time bridge the gap between what they have learned in theory at the teaching institute and in practice at school (Nilsson, 2008; Cochran-Smith, 2005; Korthagen et al, 2006). As a consequence of these problems, student teachers may not develop into an "adaptive expert" and be unable to balance their teaching (Hammerness et al., 2005).

Student teachers employ different strategies to handle the sources of complexity. This can lead to differences in their way of learning to teach. Oosterheert et al. (2002) identified individual differences in student teachers' patterns of learning to teach in a dual learning environment. The study of Hagger et al. (2008) proves as well that learning to teach is given frame and filled in differently by student teachers. Both studies have demonstrated that student teacher have individual ways of learning to teach and have also identified the differences in the degree to which student teachers learn actively and in an independent meaning oriented manner.

A dual learning environment

Traditional teacher education programmes have been criticized for the separation of theory and practice throughout the last decades (e.g., Feiman-Nemser, 2001; Korthagen et al., 2006): Student teachers often felt unprepared to face teaching in class and suffered from the practice shock (Darling-Hammond, 1999). Therefore, those programmes have been found inadequate to support the complex process of learning to teach (e.g., Korthagen et al., 2006).

It can be seen as a reaction to these circumstances that, during the last decade, a shift from traditional to dual learning programmes has occurred. In those programmes learning in a formal and an informal learning environment are combined (Endedijk et al., 2011). Related to this definition, the transcription of the combination of different (in)formal learning environments is therefore accordingly *dual learning environment*.

Student teachers in a dual learning environment simultaneously learn to teach at a teacher education institute and a practice school. To monitor student teachers' development in a dual learning programme they often have to work with a portfolio in which they describe and prove their self-evaluations and personal development plan. This personal development plan has to meet the end terms of all teacher education programmes in the Netherlands defined by The Association for the Professional Quality of Teachers (SBL).

Due to the growing shortage of teachers in the Netherlands, dual learning programmes often have a job-track and an intern-track (Endedijk et al., 2011). Some student teachers are therefore already working as a teacher, having a teachers' responsibilities, when starting the programme. The other student teachers are completing an internship to develop their teaching profession (Buitink, 2009). The internship starts with observing fellow student teachers and experienced teachers, after that the first own teaching experiences and a reflection thereupon together with other student teachers and expert teachers takes place. After half a year they start teaching independently (Endedijk et al., 2011).

A dual learning programme gives student teachers the opportunity to develop their own way of learning because they can learn from many different information sources of diverse learning environments (Endedijk et al., 2011). The combination of different learning environments is meant to gradate the transition from the education programme to the workplace and thereby to narrow the theory practice gap (Stokking, Leenders, De Jong, & Van Tartwijk, 2003). Furthermore, linking theory and practice should increase student teachers' starting competence and professional growth (Lindblom-Ylänne, Trigwell, Nevgi, & Ashwin, 2006). However, combining information and learning experiences gained at the institute and at school calls on student teachers' ability to critically reflect on their learning (Feiman-Nemser, 2001) and to self-regulate it (Endedijk et al., 2011). This has been proven to be difficult for student teachers (Endedijk et al., 2011).

Learning activities of student teachers in a dual learning environment.

Researchers have described learning activities differently, especially with respect to the divergent learning environments. Still it can be concluded that the categories of activities defined show overlap (see table 1). A general classification of the learning activities used by student teachers could be: 1) *learning by experimenting*, 2) *learning by reflecting on own teaching practice*, 3) *learning by getting ideas from others*, and 4) *learning by doing* (e.g., Hoekstra, Brekelmans, Beijaard, & Korthagen,

2009). This finding shows the use of learning activities in different learning environments (formal and informal). Thus, it is likely that learning activities will as well be displayed in the different contexts of a dual learning environment.

Table 1
Learning activities used in different learning environments

Student learning in (in)formal learning environments	Experienced teacher learning in informal learning environment/ at the workplace	Student teacher learning in dual learning environment
Formal learning environment Relating/structuring, analysing, concretising/applying, memorising/rehearsing, critical processing, selecting (Vermunt, Verloop, 1999)	Reflection, doing, experimentation, learning from others (with/without interaction) (Bakkenes, Hoekstra, Meirink, & Zwart, 2004; Meirink et al., 2007)	Remembering, evaluating, analysing, critical processing, diagnosing, reflecting (Mansvelder-Longayroux et al., 2007)
Formal learning environment Reading, listening, visual imagery, thinking or relating, writing, discussing information (Boulton-Lewis, Marton, Lewis, & Wils 2000)	Considering own practice, experiencing friction, struggling to revert to old ways, avoiding learning, experimenting, getting ideas from others (Bakkenes et al., 2010)	Evaluating, analysing, doing/experiencing, experimenting, getting information by getting feedback observing (Endedijk et al., 2011)
Informal learning environment Observing, active problem solving, using resources to gain information, imitating, information passed on by family members etc. (Boulton-Lewis, Marton, Lewis, & Wils 2000)		Orientation, familiarising, integration, application, learning to learn (Buitink, 2009)

Regulation activities of student teachers in a dual learning environment.

As yet, little research is done on student teachers regulation activities (Endedijk et al., 2011). To be able to investigate regulation activities on a detailed level, not only studies on student teachers have been explored but it was necessary to take students' regulation activities into account as well. This inclusion is possible because as Fives, Hamman and Olivarez (2007) argue, student teachers also fulfil teacher and student role. A comparison of student teachers' activities (Endedijk et al., 2011) and students' activities (see studies by Vermunt & Verloop, 1999; Zimmermann, 2002) has shown that the set of activities Endedijk et al. (2011) have identified is very complete, almost including all activities discovered by other studies (Vermunt & Verloop, 1999; Zimmermann, 2002). Therefore, the activities of this study will be presented exemplary. The authors found eight different elements of self-regulated learning: (1) *self-reflection on the learning outcome*, (2) *goal orientation*, (3) *self-efficacy beliefs*, (4) *strategic planning*, (5) *learning strategy control*, (6) *monitoring of the results*, (7) *self-evaluation of the learning process*, (8) *inferences for subsequent learning experiences*. Endedijk et al. (2008) have already shown that student teachers use regulation activities in different contexts.

According to Boekaerts and Corno (2005), teacher preparation programmes increase the chance for student teachers to learn to self-regulate their learning by structuring the learning environment. This is because student teachers have the opportunity to apply self-regulation and establish a knowledge base beyond the education institute in practice (Boekaerts & Corno, 2005). However, the problem of self-regulation is that most learners are not able to self-regulate their learning as has been proven by different researchers (e.g., Mansvelder-Longayroux et al., 2007; Oosterheert & Vermunt, 2001). Nonetheless, the ability to self-regulate is said to be a pre-condition for learning to teach in a dual learning environment (Endedijk et al., 2011).

It is noticeable that Eraut (2004) and Tynjälä (2008) have discovered that the character of the activities is not determined by the learning environment they take place in. This can be seen from the learning and regulation activities of different studies as learning and regulation activities differ in formal and informal learning environments. However, it remains unknown what learning and regulation activities are used by student teachers in a dual learning environment.

Student teachers' perception of a dual learning environment

As shown by research, student teachers' perception might be related to student teachers' learning orientations (Oosterheert et al., 2002). In the study of Oosterheert et al. (2002) the perception is represented by two scales: integrating theory and practice (CI-P) and constructive communicative press (CCP). The first scale examines in how far, according to the student teachers, the relation between theory and teaching is explained by the supervisor. The second scale determines the perceived stimulation of the supervisor to construct knowledge. Although with this study student teachers' different perception of a learning environment has been demonstrated, only the perception of *different student teacher types* of *one* learning environment (academic) has been researched. Therefore, one cannot draw conclusions about student teachers' perception of different learning environments.

However, based on this difference in perception, it is possible that it might be accountable for the so-called theory-practice gap. Even though pre-service programmes are designed to pervade the reality in classroom (Korthagen et al., 2001) they still seem unable to help student teachers overcome the experienced disparity between the theory learned at the teaching institute and the practice faced with in the schools where they work (Kalantzis, Cope, & Harvey, 2003; Cochran-Smith, 2005; Hascher et al., 2004; Hobson et al., 2008). The literature provides a number of reasons for this. The first reason is related to student teachers' own ideas with regard to their learning in a teacher education programme that are often disagreeing with the theory taught in such a programme (e.g., Wubbels, 1992). The second reason is the so-called feed-forward problem, addressed by Katz (1984). Student teachers are provided with answers to questions they have not asked at that time and with methods for possible situations to come. They either react with resistance when these information are given or with protest if these information have not or too little been given. (3) The nature of teaching is complex. Hoban (2005) states that "what a teacher does in a classroom is influenced by the interaction of many elements such as the curriculum, the context, and how students respond to" (p. 9). The reasons presented explain why student teachers were not able to abandon the theory-practice gap while learning in their education programme. Even though research indicates that the perception of a learning environment exerts influence on the experienced gap between theory and practice, its role is up to now unknown.

So, drawing a conclusion of what is known about the perception of a learning environment, it has to be noted that research has only identified differences in student teachers' perception of the *academic* learning environment. Therefore, this study will examine the perception of both contexts of a dual learning environment, the *practice school* and the *teacher education institute*. Even though a dual learning environment is designed to close the experienced gap between theory and practice by learning in a combination of practice school and education institute, it still exists. An examination of the perception of the dual learning could reveal new explanations for the ever existence.

Research Questions

Figure 1 shows the relation between the concepts presented: learning to teach (learning and regulation activities), dual learning environment (school, institute, both) and the perception of the learning environments. To detect these relations, two research questions and two related hypotheses have been established. Next, it will be explained how these questions and hypotheses were derived from the discussion of the concepts.

A dual learning environment consists of three learning environments: a practice school, a teacher education institute and a combination of both contexts. As shown by research, different learning and regulation activities are displayed in formal and informal environments. However, this is

unknown for a dual learning environment. Therefore, the first question deals with investigating the learning and regulation activities displayed at the practice school, the institute and in both contexts.

Research question 1: *What learning and regulation activities are used at the institute, the practice school and in both contexts?*

This question is aimed at determining a learning character for each learning environment. Given the difference in definition (see literature review), it is possible that different learning and regulation activities are used at the institute, at the school and in a dual learning environment. As proven by Tynjälä (2008) and Eraut (2004), the activities exercised in a learning environment are not determined by its (in)formality. Consequently, the related hypothesis is: *It is expected that different learning and regulation activities will be retraced within the school, institute and in both contexts.*

Oosterheert et al. (2002) have concluded from their study that different types of student teachers perceive a learning environment differently. The perception of the contexts of a dual learning environment is unknown. This would be worth examining, because new teachers often experience a separation from theory and practice during their teacher education, as well in traditional as in dual education programmes (e.g., Hobson et al., 2008; Cochran-Smith, 2005).

Research question 2: *How are the two learning environments (teacher institute and practice school) perceived?*

The aim of this is to find out how student teachers experience the supervision and learning at their teacher education institute and the supervision and learning at their practice school. When working at school student teachers often experience a gap between the theory and the practice of their education (e.g., Cochran-Smith, 2005; Hascher et al., 2004; Hobson et al., 2008; Korthagen et al., 2006). The hypothesis is therefore based on the existence of the theory-practice gap and subsequently reads: *It is expected that the perceptions of the learning environments (institute and practice school) differ*.

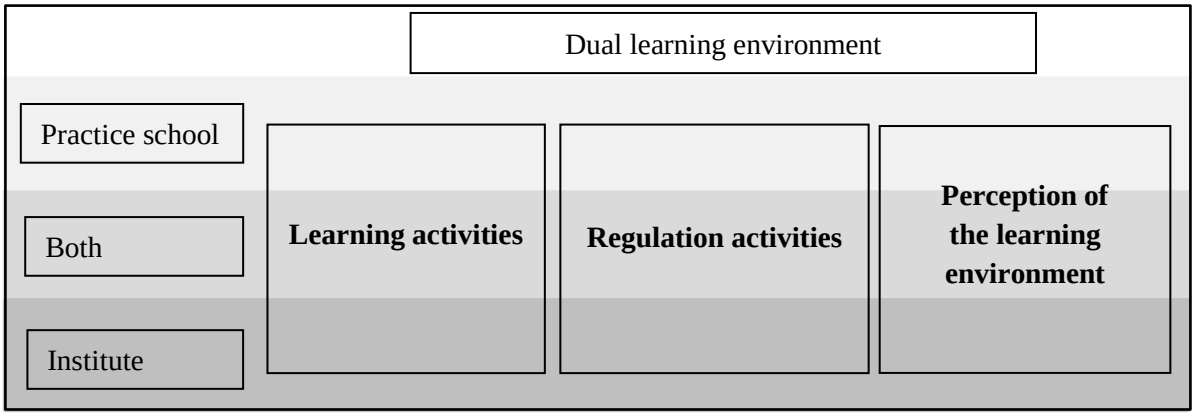

Figure 1. *Learning to teach in a dual learning environment: learning activities, regulation activities and the perception of the learning environment in the divergent learning environments.*

Learning to teach in a dual learning environment - Context of the thesis

The learning to teach of student teachers at the institute and the practice school has been studied in a postgraduate one-year teacher education programme in the Netherlands that prepares student teachers for subject-teaching in upper secondary school. The university-based post graduate teacher education consists of the subject education, build up of 240 credits, and thereafter of a one year combination of learning from theory and practice (Tryggvason, 2009). This combination of learning parallel at a practice school (giving lessons) and at the education institute (following courses) is called a dual learning program (Endedijk et al., 2011). The last assessment of student teachers following this programme is exclusively based on their portfolio and a final interview to verify their self-evaluation and development (Endedijk et al., 2011).

Method

This bachelor thesis uses existing data from the study of Endedijk et al. (2011). The descriptions of the participants and instruments are therefore adapted from her study. The two different research questions call for two different instruments. Student teachers' learning and regulation activities were assessed with the Structured Learning Report and the perception of the supervision and learning at the teacher education institute and the supervision and learning at the practice school was determined by using a questionnaire. The data gathered will be analysed with the statistics programme PASW statistics 20.

Participants

Participants were 172 full-time student teachers (two cohorts) and 82 full-time student teachers (one cohort) from a post-graduate teacher education institute, learning in both contexts of a dual learning programme: at universities and at schools. All student teachers were teaching one of the secondary school subjects.

Instruments

To answer the research questions established, the Structured Learning Report and a questionnaire were used. Those instruments will be explained more detailed below. All student teachers that took part in this research filled in both, the Report and the questionnaire.

Instrument 1: The Structured Learning Report – measuring learning and regulation activities.

Student teachers' learning and regulation activities within different learning events of the dual learning programme were measured with a structured digital log: The Structured Learning Report. The validity, content and face, and the reliability of the instrument are satisfactory (Endedijk et al., 2011).

Measuring learning and regulation activities. The Structured Learning Report is made up of six Learning Reports (n=6). It is a web-based questionnaire that measures several events. As such, it allows the student teachers to assess the questionnaire throughout the whole data collection process. Another advantage is that irrelevant questions, as being the case with unplanned learning experiences, can be skipped. Seven multiple choice questions reflect separate aspects of self-regulation (Endedijk et al., 2011, Appendix A). Multiple choice questions inherit the advantage that they make the instrument less time consuming for both, researchers and participants (Endedijk et al., 2011). One answer possibility was open, giving the possibility to choose the category "otherwise, namely…" so that student teachers had the chance to formulate an answer on their own, if they felt their response not to be adequately represented in the multiple choice options. However, student teachers used this option infrequently and it was therefore excluded from the analysis. The variables measured are based on the work of Pintrich (2000): *Motivation for learning, learning strategy, learning strategy control, monitoring of the learning results, reflection on the learning outcome, self-evaluation of the learning experience* (including reasons for dissatisfaction) and *inferences for subsequent learning experiences.* The question on *reflection on learning outcome* was an open question, to let student teachers formulate their own thoughts on what they think they have learned. The variables have been described in the literature review.

Instrument 2: Questionnaire – perception of the learning environments.

To examine how student teachers perceive the institute and the practice school, a questionnaire was spread among them. The questionnaire was developed for this study. This is why no data on the validity of the questionnaire is available yet. With the study the internal structure and reliability of the questionnaire will be tested.

Measuring perception. Three scales to measure the perception were used. Constructive communicative press (CCP), integration theory and practice (IT-P) and self-regulation pedagogy. All scales are presented in Dutch to provide the original formulation used by Endedijk et al. (2011). The

answers possibilities were scaled from 1 (this is not applicable for my teacher educator (group)/mentor) to 7 (this is applicable for my teacher educator (group)/mentor).

The first scale examines in how far, according to the student teachers, the relation between theory and teaching is explained by the supervisor. The second scale determines the by the student teachers perceived stimulation of the supervisor to construct knowledge. For scale 1, see table 2, for scale 2, see table 3 (Tables A). The third scale deals with the self-regulation pedagogy. This scale is based on all elements of regulation that can be found in theory (Endedijk et al., 2011). Here the following question is asked: In how far do the following statements apply to your teacher educator /mentor? Good support in this case means the student teachers' mentor is helping him/her in a usable way when necessary. The items of the three scales have comparable subjects but are formulated in reference to the different contexts.

Factor retention and analysis – the structure of the questionnaire. A factor analysis was carried out to determine student teachers' perception of the supervision and learning at the institute and the school. According to Fields (2009) the Kaiser-Meyer-Olkin and Barlett's Test of Sphericity tests verified that the sample is suitable for a factor analysis (KMO = .843; Barlett's Test of Sphericity χ^2 (903) = 4469.686, p<.000).

The first step in analysis was to try to reconstruct the set of scales Endedijk et al. (2011) had identified. Therefore, a factor analysis with the original number of six scales was carried out. This analysis was conducted on the 43 items of the scales *Constructive communicative press (CCP), Integrating Theory and Practice (IT-P)* and *self-regulation pedagogy* of Endedijk et al. (2011). All scales contain two categories: perception of supervision and learning at the practice school and perception of supervision and learning at the institute. However, the results showed that this number of factors does not represent the composition of the scales. Furthermore, one factor consisted of only one item. It was thus decided to not retain six factors for the analysis. It was chosen to do a parallel factor analysis to determine the number of factors that represents the perception best. The parallel analysis has been conducted with the computer software developed in the frame of the work of Patil, Singh, Mishra and Donovan (2008). 100 correlation matrices were established and the seed was set on 1000. The major factors were determined by comparing the eigenvalues of the parallel factor analysis with the eigenvalues of the original dataset. Only those factors were retained whose eigenvalues were greater than the eigenvalues from the random data. This resulted in total five factors for the factor analysis (see table 4, Tables B). Still, the scales were not adequately represented. Thereafter, factor analyses with a number of four, three and two factors were carried out. Screeplots of the eigenvalues pleaded for a two factor solution. The eigenvalues of the first two factors were outstanding and explained together 43.07%. The screeplot showed an elbow after the second factor. According to Cattells' (1966) "above the elbow" principle it was chosen to work with this number of factors.

After the determination of the number of factors, a factor analysis with two factors was conducted. The goal was to find out if student teachers perceive their learning environments differently. It was hereby looked at the perception of supervision and learning at school and the teacher education institute. Missing scores were deleted listwise, the items were rotated (varimax method) and extracted with Principal Component method.

Procedure

The data collection with the Structured Learning Report to determine learning and regulation activities was carried out with two cohorts of 172 student teachers. The first cohort had three measurements of a period of two weeks. The second cohort had only two measurement occasions. Therefore, in cohort one, a maximum of 18 Learning Reports could be filled in by every student teacher, in the second cohort the number of Learning Reports to be filled in was 12 (Endedijk et al., 2011). Student teachers were asked to report six different learning experiences after three, six, and nine months after having started their pre-service programme online in the Structured Learning Report. They were ought to choose any kind of learning supporting their improvement to teach, but it had to have taken place within the last two weeks. Student teachers had to rapport two learning experiences in the context of the teacher education institute, two in the context of the practice school and they may choose two on their own (Endedijk et al., 2011).

The cohort of student teachers filling in the questionnaires to examine their perception of the learning environments consisted of 82 student teachers. The questionnaires were gathered in two periods of two weeks. After these two weeks a reminder was send to collect the missing questionnaires (Endedijk et al., 2011). In total 152 of the original 164 questionnaires were received. This implies that the response rate is 92.68%.

Analysis

The analysis of both datasets was done with the SPSS programme PASW statistics 20. To be able to answer the question, regarding learning activities and regulation activities used at the institute, the practice school and the dual learning environment a Chi-square test on the seven variables of Endedijk et al. (2011) (see description of instrument 1). The Chi-square test is aimed at detecting differences in learning and regulation activities displayed in the different environments. Additionally to the Chi-square analyses a post-hoc adjusted residual analysis (Haberman, 1973) is done to find out if the relation between variables is significant and if certain cells in the crosstabs differ significantly from the expected frequency. A value of an adjusted residual larger than 2 or smaller than -2, indicates a significant deviation from the expected frequency (Haberman, 1973). By doing so, the relations between specific categories of the variables can be identified.

To answer the question referring to the perception of the two environments (institute and practice school) a paired samples *t*-test on comparable items is done. As has been explained in the description of the questionnaire a selection of items is necessary because not all items are comparable due to differences in their statements. A paired samples *t*-test compares the means of two variables and calculates the difference between them. It also determines if this difference is significant or not (Field, 2009). This might reveal a perception in favour of the one or the other learning environment.

Results

Relation of learning and regulation activities with the contexts (school, institute, both)

The relation between the learning activity and regulation activities and the context was analysed with a Chi-square test. The outcomes of the calculation can be found in Tables C (tables 5 to 11), including the Observed Frequency (OF), Expected Frequency (EF) and Adjusted Residual (AR). In the following, the most striking results for the school, the institute and both contexts are presented.

Motivation. Student teachers first had to answer whether the learning experience was intended or unintended. If the learning experience took place unintended student teachers could skip the question because it then was assumed that the learning experience happened to be spontaneously. 813 from a total 1589 learning experiences were reported to be unintentional (see table 5, Tables C). Five other reasons for motivation to learn used in the Structured Learning Report were (1) *unsatisfied about a previous experience*, (2) *to practice*, (3) *curiosity*, (4) *stimulation by others* or (5) *preparing for future*. The Chi-square analysis revealed a relation between the different types of motivations student teachers reported and the contexts (school, institute, both), χ^2 (10)=129.285, p=.000 on the p=.05 level.

School. It is noticeable that only one reason, *unsatisfied on previous experience*, had a higher observed frequency than an expected frequency (OF = 188, EF = 162.3, AR = 3.6). The other reasons had a higher expected frequency than observed frequency (*curiosity*: OF = 63, EF = 90.8, AR = -5.0; *stimulation by others*: OF = 66, EF = 73.4, AR = -5.0; *preparation for future*: OF = 55, EF = 83.9, AR = -5.4).

Institute. The most outstanding result has been found with regard to the *preparation for future*. The difference between the expected and observed frequency is highly significant (OF = 70, EF = 33.0, AR = 7.8). Student teachers' *dissatisfaction on previous experience* was observed less than expected (OF = 28, EF = 63.7, AR = -5.7). *Curiosity* and *stimulation by others* were observed more than initially expected (*curiosity*: OF = 59, EF = 35.7, AR = 4.7; *stimulation by others*: OF = 26, EF = 28.8, AR = 4.7).

Both. The results in the dual learning environment are overall less striking. Some interesting outcomes are presented in the following. *Unsatisfied on previous experience* was observed more often that in it was expected (OF = 45, EF = 35.0, AR = 2.0). The same can be found with *to practice* (OF = 23, EF = 15.5, AR = 2.1). *Preparation*, on the opposite, is expected to happen more often but is observed less (OF = 10, EF = 18.1, AR = -2.1).

Learning strategy. The seven types of learning strategies used in the Structured Learning Report were: (1) *learning by doing*, (2) *learning by experimenting*, (3) *learning by evaluating*, (4) *learning by analysing*, (5) *learning by getting information*, (6) *learning by getting feedback* and (7) *learning by observing*. The Chi-square test again revealed a significant relation between the learning strategies and the contexts they were used in, χ^2 (12)=633.266, *p*=.000.

School. The post hoc analysis (table 6, Tables C) shows that *learning by doing* was significantly more often observed than was expected beforehand (OF = 371, EF = 291.8, AR = 8.8). Even though less significant, the same is found for *learning by experimenting* (OF = 167, EF = 142.2, AR = 3.6), *learning by evaluating* (OF = 112, EF = 82.1, AR = 5.5), *learning by analysing* (OF = 93, EF = 79.9, AR = 2.5) and *learning by getting feedback* (OF = 178, EF = 157.5, AR = 2.9). The most obvious difference was found between the observed and expected frequency of *learning by getting information*. Even though a very high frequency was expected, the observed frequency was much lower (OF = 48, EF = 210.9, AR = -20.3).

Institute. *Learning by getting information* was at the institute as well the most striking result. In this context, contrary to the practice school, the expected frequency was much lower than the observed frequency (OF = 263, EF = 89.0, AR = 24.1). *Learning by doing* (OF = 56, EF = 123.1, AR = -8.3), *learning by experimenting* (OF = 21, EF = 60.0, AR = -6.3), *learning by evaluating* (OF = 3, EF = 34.7, AR = -6,5) *learning by analysing* (OF = 14, EF = 33.6, AR = -4.1) and *learning by getting feedback* (OF = 45, EF = 66.5, AR = -3.3) have a higher expected frequency than observed frequency.

Both. The results are less outstanding compared to the two other contexts. However, *learning by doing* in both contexts was expected to happen more often than it was actually observed (OF = 49, EF = 61.1, AR = -2.0). *Learning by experimenting*, on the opposite, had a lower expected frequency than the actual observed frequency (OF = 44, EF = 29.8, AR = 3.0).

Learning strategy control. This question was aimed at revealing the reason for choosing a specific learning strategy. Only student teachers who had not reported an unintended learning experience were supposed to answer the question. The number of unintended learning experiences was very high: 1206 from 1683 total (see table 7, Tables C). Reasons for choosing a learning strategy were: (1) *no other way to learn this*, (2) *suggestion of someone else*, (3) the *easiest or fastest way* to learn this and (4) *compared with other ways of learning, this way often works well*. On a *p*=0.05 level the reasons were related to the different contexts (school, institute, both), χ^2 (8)=45.749, *p*=.000.

School. The reason *no other way to learn this* had a higher observed frequency than was expected (OF = 118, EF = 103.1, AR = 2.5). The reason *suggestion of someone else* (OF = 46, EF = 57.0, AR = -2.4) and e*asiest or fastest way to learn this* (OF = 53, EF = 64.3, AR = -2.3) have both a higher expected frequency value than the actual observed frequency.

Institute. The reason *no other way to learn this* was significantly less reported than expected (OF = 21, EF = 43.5, AR = -4.2). The same is true for *compared with other ways of learning, this often works well for me* (OF = 14, EF = 27.4, AR = -3.1).The opposite was found with *this is the easiest or fastest way to learn this.* Here the expected frequency was significantly lower than the observed frequency (OF = 40, EF = 27.1, AR = 3.0),

Both. In the combination of the two contexts the reason *suggestion of someone else* showed that this strategy choice was observed more often than expected (OF = 20, EF = 12.9, AR = 2.2). The reason *compared with other ways of learning, this often works well for me* has an equivalent result (OF = 22, EF = 14.7, AR = 2.1).

Monitoring. The seven different types of monitoring learning outcomes were (1) *something worked out well*, (2) *something did NOT work out well*, (3) *the reaction of others*, (4) *feedback*, (5) *reflection on my experience*, (6) *new information* and (7) *awareness of own behaviour*. Again, the monitoring types are significantly related to the contexts (school, institute, both), χ^2 (12)=514.681, *p*=.000. An overview of the results is given in table 8 (see Tables C).

School. Especially the realisation that *something did NOT work out well* was reported at school significantly more than expected (school: OF = 98, EF = 64.4, AR = 6.9). The realisation that *something did work out well* (OF = 269, EF = 222.7, AR = 5.6) and *the reaction of others* (school: OF = 133, EF = 93.3, AR = 6.9) show the same outcomes. However, the most remarkable result is found regarding *new information*. The expected frequency is a lot higher than the actual observed frequency (OF = 54, EF = 186.0, AR = -17.8).

Institute. *New information* is at the institute as well the most striking. In contrast to the results of the school context, the observed frequency is much higher than the expected (OF = 226, EF = 81.5, AR = 20.9). The opposite has been found for *something worked out well* (OF = 40, EF = 97.5, AR = -7.8), *something did NOT work out well* (OF = 3, EF = 28.2, AR = -5.7), *the reaction of others* (OF = 15, EF = 40.9, AR = -5.0) and *reflection on my own experience* (OF = 39, EF = 62.7, AR = -3.8). All those reasons have a significant higher expected frequency than observed frequency.

Both. In the combination of both contexts, the results have been less outstanding. Still, some significant outcomes can be reported. *Something worked out well* had an apparent higher observed frequency than expected frequency (OF = 61, EF = 49.7, AR = 2.0). Contrary results have been discovered regarding *something did NOT work out well*. Here, the expected frequency was much higher than the observed frequency (OF = 6, EF = 20.8, AR = -3.4). The same results have been found for *the reaction of others* (OF = 7, EF = 20.8, AR = -3.4) and *new information* (OF = 29, EF = 41.5, AR = -2.3). *Awareness of own behaviour* was reported more than expected by student teachers in both contexts (OF = 30, EF = 19.4, AR = 2.7). *Reflection on my experience* is as well reported more than initially expected (OF = 48, EF = 32.0, AR = 3.3).

Reflection. The seven different reflections on learning outcomes used in the Structured learning Report were: (1) *rule of thumb*, (2) *factual knowledge*, (3) *procedural knowledge*, (4) *own learning or identity*, (5) *teaching practice*, (6*) theory of practice*, and (7) *no description of learning*. The different types of reflection student teachers were significantly related to the contexts they were used in, χ^2 (12)=186.757, *p*=.000.

School. Analysis (see table 9, Tables C) shows that especially the observed frequency of *procedural knowledge* differs significantly from its expected frequency. It is in fact apparent less reported (OF = 42, EF = 83.7, AR = -7.5). This is the same with *factual knowledge*. It was less often observed than expected to be observed (OF = 197, EF = 239.0, AR = -4.9). *Reflection as a rule of thumb* was observed more often than expected (OF = 186, EF = 155.3, AR = 4.2). This is true for *theory of practice* (OF = 207, EF = 175.2, AR = 4.2) and *no description of learning* as well (OF = 72, EF = 56.0, AR = 3.5).

Institute. The most striking results were found with regard to *factual knowledge* which was significantly more observed to take place than it was expected (OF = 160, EF = 102.9, AR = 7.4), and *procedural knowledge* which was as well observed more than was expected (OF = 81, EF = 36.0, AR = 9.1). *Reflection as a rule of thumb* was less often observed than expected (OF = 38, EF = 66.9, AR = -4.4). The same results have been found for *own learning or identity* (OF = 77, EF = 94.4, AR = -2.3), the use of *teaching practice* (OF = 42, EF = 60.2, AR = -2.9), *theory of practice* (OF = 49, EF = 75.5, AR = -3.9) and *no description of learning* (OF = 13, EF = 24.1, AR = -2.7).

Both. *Regulation as a change in their own learning or identity* was observed more in both contexts than initially expected (OF = 70, EF = 50.5, AR = 3.3). *Factual knowledge* was found out to be less displayed than expected (OF = 40, EF = 55.1, AR = -2.5). The same applies for the use of *teaching practice* (OF = 42, EF = 60.2, AR = -2.9).

Evaluation (reasons for dissatisfaction). When completing the Structured Learning Report, student teachers were also asked to evaluate their learning experience with regard for reasons of being unsatisfied. Student teachers could chose among the following reasons: (1) *earlier in my development*, (2) *better preparation*, (3) *tackling things differently*, (4) *behaviour of my pupils* and (5) *totally satisfied*. The Chi-square test revealed that the relation between the reasons for dissatisfaction and the contexts (school, institute, both) is significant, χ^2 (8)=71.061, *p*=.000. An overview of the results is given in table 10 (see Tables C).

School. *Tackling things differently* and *totally satisfied* show a contrasting result. *Tackling things differently* is significantly named more often than expected (OF = 57, EF = 40.4, AR = 4.2) whereas *totally satisfied* is reported less often than it was expected (OF = 807, EF = 837.6, AR = -4.2).

The reason *behaviour of my pupils* was named more often than expected as well (OF = 36, EF = 24.1, AR = 3.9).

Institute. The most noticeable result has been found regarding *totally satisfied.* The expected frequency is strikingly lower than the actual observed frequency (OF = 405, EF = 359.5, AR = 7.0). At the institute, the relations between the reasons and the context have been found to be always significant, therefore only the noticeable outcomes will be reported. *Tackling things differently* has been reported significantly less than expected (OF = 2, EF = 17.3, AR = -4.4). The same has been found for *better preparation* (OF = 3, EF = 9.6, AR = -2.5).

Both. The reason *earlier in my development* was named significantly more than initially expected (OF = 28, EF = 16.2, AR = 3.3). A similar result has been discovered for *better preparation* (OF = 11, EF = 5.1, AR = 2.8). On the opposite, *totally satisfied* was reported significantly less than expected (OF = 177, EF = 191.9, AR = -2.9).

Inferences for new learning experiences. The question was aimed at figuring out how student teachers wanted to go on with what they had learned. Possible answers were: (1) *no new plans*, (2) *trying again*, (3) *concrete action plan*, (4) *consolidation*, (5) *further improving*, (6) *applying in practice*, (7) *trying out in different situation* and (8) *new learning goal*. The conducted Chi-square test revealed a significant relation between the inferences for new learning experiences and the contexts (school, institute, both), χ^2 (14)=327.368, *p*=.000.

School. The analysis (see table 11, Tables C) showed that *no new plans* was mentioned in the school context less often than expected beforehand (OF = 86, EF = 99.3, AR = -2.2). *Applying in practice* shows an outstanding result. The expected frequency is significantly higher than the actual observed frequency (OF = 183, EF = 294.3, AR = -12.2). *Trying again* was significantly more often reported at school than expected (OF = 35, EF = 26.6, AR = 2.6). The same results have been found for *concrete action plan* (OF = 80, EF = 61.2, AR = 4.0), *consolidation* (OF = 157, EF = 123.5, AR = 5.1), *further improving* (OF = 313, EF = 274.9, AR = 4.3) and *trying out in different situation* (OF = 92, EF = 70.8, AR = 4.1).

Institute. The two most noticeable reasons are *further improving* and *applying in practice*. *Further improving* shows that the expected frequency is significantly higher than the observed frequency (OF = 48, EF = 117.2, AR = -8.7). *Applying in practice* is significantly more often reported to be used at the institute than it was expected (OF = 254, EF = 125.4, AR = 15.8). A more moderate, but still significant outcome has been found for *no new plans* (OF = 63, EF = 42.3, AR = 3.9). Here as well, the observed frequency is higher than the expected frequency. The opposite results are found for *concrete action plan* (OF = 11, EF = 26.1, AR = -3.5), *consolidation* (OF = 23, EF = 52.6, AR = -5.1), *trying out in different situation* (OF = 10, EF = 30.2, AR = -4.4) and new *learning goal* (OF = 24, EF = 33.8, AR = -2.0). All those factors were found out to have a higher expected than observed frequency.

Both. *Further improving* has a significant higher observed value in both contexts than it was expected (OF = 93, EF = 61.9, AR = 5.0). *Applying in practice* is less often reported to be used in both contexts than it was initially expected (OF = 49, EF = 66.3, AR = -2.7).

Perception of the learning environment (practice school and teacher education institute)

The conducted factor analysis revealed a distinct perception of supervision and learning at the practice school and the institute (see table 12, Tables D). To exclude low scoring items, all items with a value below .40 were deleted. This resulted in the exclusion of two items, ITPM4 (referring to student teachers' perception that with their teacher educator theory and practice are unrelated) and ITPS3 (referring to student teachers' perception that with their mentor theory and practice are unrelated). The new dataset entails of 41 items. The factor supervision and learning at the practice school consists of 21 items (M=4.39; SD=.27; α=.94) and the supervision and learning at the institute of 20 items (M=4.94; SD=.47; α=.92) as can be seen in table 13.

Table 13
Descriptives of learning and supervision at the practice school and the teacher education institute

	Number of items	Mean	Standard deviation	Cronbachs α
Practice school	21	4.39	.27	.94
Education institution	20	4.94	.47	.92

To describe the difference in perception on a more detailed level, a number of selected items will be compared (see table 14). The selection is made based on the comparability of their statements. The following items are being analysed:

Table 14
Description of the to be compared items

Number of item	Item	Description of items
1a	CCPM4	In a discussion my teacher educator stimulates me to take up a stance
1b	CCPS4	In a discussion my mentor stimulates me to take up a stance
2a	CCPM6	After a teacher education meeting I have the strong feeling of having learned something
2b	CCPS6	After a meeting with my mentor I have the strong feeling of having learned something
3a	ITPM5	My teacher educator explains the relation between theory and teaching
3b	ITPS4	My mentor explains the relation between theory and teaching
4a	ZDM2	My teacher educator supports me in the development of a personal development plan
4b	ZDS2	My mentor supports me in the development of a personal development plan
5a	ZDM6	My teacher educator supports me reviewing my development
5b	ZDS6	My mentor supports me reviewing my development

The items for the comparison were chosen based on the comparability of the statements. An overview of the Mean, Standard deviation and the p-value of the compared items can be found in table 15. Also the effect size (r) is given to show the cogency of the discovered effect.

Table 15
Mean, standard deviation and p-value of the items 1a to 5b.

Item	Mean	Standard Deviation	p- value
1a	4.54	1.51	.697
1b	4.61	1.53	
2a	4.06	1.64	.000
2b	5.05	1.57	
3a	4.93	1.41	.000
3b	3.24	1.45	
4a	4.87	1.32	.000
4b	3.44	1.72	
5a	5.07	1.29	.001
5b	4.53	1.81	

Comparison of the items 1a and 1b. The means of the items describing the stimulation by the teacher educator/the mentor to take up a stance in a discussion (teacher educator: *M*=4.54; *SD*=1.51; mentor: *M*=4.61; *SD*=1.53) differs insignificantly at the $\alpha = 0.05$ level ($t(146)=-.39$; $p=.697$, r= .03). Thus, there is no or just marginal difference in student teachers' perception.
Comparison of the items 2a and 2b. The means of the item 2a (After a teacher education meeting I have the strong feeling of having learned something) (*M*=4.06; *SD*=1.64) and 2b (After a meeting with my mentor I have the strong feeling of having learned something) (*M*=5.05; *SD*=1.57) differ significantly at the $\alpha = 0.05$ level ($t(146)=-6.05$; $p=.000$, r= .44). To conclude, student teachers feel to have learned more after having had a meeting with their mentor than having taken part in a teacher education meeting.
Comparison of the items 3a and 3b. Table 15 shows that the mean of the item describing the explanation of the relation between theory and teaching the teacher educator gives (*M*=4.92; *SD*=1.41) differs significantly from the mean of the item describing the explanation of the relation between theory and teaching the mentor gives (*M*=3.24; *SD*=1.57) at the $\alpha = 0.05$ level ($t(146)=11.63$; $p=.000$, r= .67). At their education institute student teachers experience their supervisor to better explain the relation between theory and teaching than at the practice school.
Comparison of the items 4a and 4b. The means of the items referring to the supports of the teacher educator/the mentor in the development of a personal development plan (teacher educator: *M*=4.87; *SD*=1.32; mentor: *M*=3.44; *SD*=1.72) differ significantly at the $\alpha = 0.05$ level ($t(146)=9.12$; $p=.000$, r= .60). This result implies that, student teachers feel to be better supported in developing their personal development plan at the institute and thus they feel less supported by their mentor at school.
Comparison of the items 5a and 5b. As can be seen in table 15, the mean of the item describing the support of the teacher educator in helping student teachers to review their development (*M*=5.07; *SD*=1.29) differs from the mean of the item describing the support of the mentor in helping student teachers to review their development (*M*=4.53; *SD*=1.81) significantly at the $\alpha = 0.05$ level ($t(146)=3.35$; $p=.001$, r= .26). Student teachers perceive the support in reviewing their development by their teacher educator at the institute as better than the support by their mentor at the practice school.

As becomes apparent from the discussion of the selected items, student teachers perceive the support and learning at the teacher education institute different from that of the practice school. Indicated by the positive difference of the Means in support of the teacher educator items, student teachers might favour the learning and supervision at their teacher education institute to their practice school. However, keeping in mind the scaling of answers (1 to 7; see description of instrument 2), it has to be noted that the average Means are quite low (average at teacher education institute: 4.69; average at practice school: 4.17). This implies that there is room for improvement regarding learning and support at both different education arrangements, teacher education institute and practice school.

Conclusion, Discussion and practical implications

The first aim of this bachelor thesis was to retrieve the learning and regulation activities student teachers use in the environments central in this study (institute, practice school and a combination of both). The literature review has revealed that the activities of student teachers, students and experienced teachers employed in the different environments are very similar to each other. This might be because student teachers fulfil a teachers' and a students' role as well (Fives et al., 2007). Hence, the comparability of those different studies is given. Due to the completeness of activities, it was taken advantage of the variables identified by Endedijk et al. (2011). The second aim was to find out how student teachers perceive a dual learning environment. It has been discovered that even though a dual learning environment combines learning in theory and practice, student teachers experience a gap between it. The outcomes of the analysis are presented in the following.

Interpretation of the relation between learning and regulation activities and the learning environment

To unravel the relation between student teachers' learning and regulation activities and the three environments: school, institute and a combination of both, a Chi-square test was carried out. It was expected that different learning and regulation activities are displayed in the different learning environments as had been indicated by the discussion of studies on learning and regulation activities in formal and informal learning environments. All learning and regulation activities showed a significant relation with the contexts. This confirms the established hypothesis. In the following, the outcomes will be interpreted in detail per context and discussed in reference to theoretical and practical implications. A complete overview of activities employed can be found in table 16.

Table 16

Distribution of learning and regulation activities over school, institute and both contexts

School	Institute	Both contexts
	Motivation for learning	
Unintentional Unsatisfied about previous experience	Curiosity Stimulation by others Preparing for future	Unsatisfied about previous experience To practice
	Learning strategy	
Learning by doing Experimenting Evaluating Analysing Getting feedback	Learning by getting information	Learning by experimenting
	Strategy choice	
No other way to learn this	Unintentional learning experience Easiest or fastest way	Unintentional learning experience Suggestion of someone else Compared with other ways of learning, this way often works well for me
	Monitoring	
Something worked out well Something did NOT work out well Reaction of others	New information	Something worked out well Reflection on my experience Awareness of own behaviour
	Reflection	
Rule of thumb Theory of practice No description of learning	Factual knowledge Procedural knowledge	Own learning or identity Teaching practice

Evaluation (reasons for dissatisfaction)		
Tackling things differently Behaviour of pupils	Totally satisfied	Earlier in my development Better preparation
Inferences for new learning experiences		
Trying again Concrete action plan Consolidation Further improving Trying out in different situations	No new plans Applying in practice	Further improving

Practice school. At the practice school student teachers are *motivated* to learn because of dissatisfaction about their previous experience (see also table 16). The use of *learning strategies* is more versatile than in the other contexts. At school student teachers are learning by doing, experimenting, evaluating, analysing and getting feedback. However, their *strategy choice* is always the same: student teachers reported that there was no other way to learn. They *monitor* their learning results based on the observation if something worked out well or not and by the reaction of others. They *reflect* by using for example rules of thumb or theory of practice. A *reason for dissatisfaction* was reported to be the behaviour of pupils. *Inferences for new learning experiences* are trying again, having a concrete action plan, consolidation, further improving and trying out learning experiences in different situations.

Similar results regarding learning activities in an informal learning environment have emerged from the studies of Bakkenes et al. (2004) and Meirink et al. (2007). They discovered that experienced teachers learn by experimenting and also evaluate their learning at the workplace. The activity *getting feedback* of this thesis is comparable to what Bakkenes et al. (2004) and Meirink et al. (2007) have called *learning from others.* Boulton-Lewis et al. (2000) have researched students' activities in an informal environment. Parallels from this study can be retraced when regarding the students' way to monitor learning. Just as student teachers they observe and imitate others. Also, they try to actively solve problems, which is comparable to *having a concrete action plan* of student teachers.

Teacher education institute. Student teachers *motivations for learning* at their institute are curiosity, stimulation by others and preparation for the future. They only display one *learning strategy*, namely learning by getting information. This *learning strategy is chosen* because it is the easiest or fastest way (see also table 16). The comparison of what they know with new information they gained is the way student teachers *monitor* their learning. They *reflect* on their learning process making use of factual and procedural knowledge. Interestingly student teachers are mostly *totally satisfied* with the learning experiences they make at the institute. As a consequence for *new learning experiences* they either have no new plans or say that they want to apply in practice what they have learned.

Comparing the results of student teachers of this thesis with students' learning in formal learning environments identified by for example Vermunt and Verloop (1999) and Boulton-Lewis et al. (2000) it becomes apparent that students' activities like reading, analysing or relating are related to processing and using information. This has been discovered to be the main interest of student teachers at the teacher education institute as well.

Both contexts. In the combination of both contexts, student teachers report that their *motivation for learning* emerges from dissatisfaction about a previous experience and to practice things they learned. They use experimenting most often as *learning strategy*. *Reasons to employ this strategy* are the suggestion of some else or comparing it to others ways, it had often worked out (see also table 16). Student teachers *monitor* their learning experiences by observing if something worked out well, by the reflection on their experience or through observing their own behaviour. They *reflect*

on their own learning or identity and their teaching practice. Reasons for them to be dissatisfied are that they could have prepared themselves better, or that they would have like to known something earlier in their development. For *future learning experiences* student teachers want to further improve.

Mansvelder-Longayroux et al. (2007) have pointed out similar results of student teachers' activities in a dual learning environment to those discovered in this bachelor thesis. It is noticeable that Mansvelder-Longayroux et al. (2007) have as well identified evaluating, analysing, reflecting and critical processing as activities in a dual learning environment. This is very close to the findings of this thesis and therefore supports what has been discovered. Also Buitinks' (2009) study fosters the learning character identified of the dual learning environment. He showed that student teachers use activities like integrating, applying and learning to learn. This argues in favour for the reflective way of learning in a combination of institute and practice school.

The discussion per context has shown that the typology of the learning environment resembles those of other researchers. In this thesis the learning in the different learning environments can be characterised as follows: At the practice school student teachers' learning can be characterised as "hands on". They test an activity in different situations and try it, as well in different situations, again. They reflect on their learning by using rules of thumb or theory of practice. At the institute, student teachers' main goal is to gather information. They even monitor their learning by comparing what they know to new information and reflect by the use of factual and procedural knowledge. In both contexts student teachers learn in a self-reflective manner. They are aware of their behaviour and reflect on their experiences, their own learning identity and their teaching practice.

The results of the varied use of learning and regulation activities in and thereby also emerging different learning characters of the different contexts can be explained by the work of Tynjälä (2008) and Eraut (2004). They concluded that the character of the learning environment does not determine the activities employed in that particular environment. The description of the learning character of the different contexts supports Tynjäläs' (2008) statement that learning at the workplace, in this case the practice school, contains both, formal and informal aspects, although they are weighted differently. This thesis has furthermore proven that the same is true for the formal environment, in this case, the teacher education institute and the combination of both contexts. This fact corresponds to Tynjäläs' (2008) suggestion that "to be successful, school learning should adopt certain features of workplace learning […] and […] workplace learning should be developed by utilising strong features of formal school learning" (p.140). This indicates that a dual learning programme is probably the right choice to support student teachers learning to teach, as well with regard to the two contexts separately as in their combination.

Interpretation of the perception of the supervision and learning at the practice school and at the institute.

With an examination of the perception of supervision and learning at the practice school and at the institute, it was tried to detect differences in perception with regard to the different learning environments. Based on what is known about the existence of theory-practice gap (e.g., Kalantzis et al., 2003; Wubbels, 1992; Korthagen et al., 2001) it was expected that student teachers perceive the school environment differently from the institute environment. The factor analysis conducted confirms this hypothesis. A detailed explanation of the results is given by comparing five pairs of items (see for overview table 14) with a paired samples *t*-test. As has been indicated by not particularly high Means, the learning and the support in both contexts can be improved. The interpretations of the results are given accordingly.

The comparison of the items describing the stimulation by the teacher educator/mentor to take up a stance in a discussion (items 1a and 1b) has shown that student teachers do not experience a difference between the encouragement of their teacher educator and their mentor. To the present and with the available information, this outcome can not be adequately explained. It might be that both supervisors equally see this to be a part of their supervisors' role.

When comparing the items referring to the feeling of having learned something after a meeting with the teacher education group/mentor (items 2a and 2b), student teachers reported that they felt to have learned more in a discussion with their mentor than in a teacher education meeting. This could be

because in a conversation with their mentor they have a personal and private conversation. A teacher education meeting involves about 20 student teachers total, which means it is a group and not a private discussion. The chance to ask individual questions is probably smaller than during an individual mentor talk.

The items outlining the teacher educator's/mentor's explanation of the relation between theory and teaching (items 3a and 3b) have shown that student teachers experience their supervisor at their education institute to better explain this relation than their supervisor at their practice school does. It might be that a mentor at school does not see this a part of his/her task or that he/she even lacks knowledge of this relation.

Analogue to the preceding outcome, the comparison of the items 4a and 4b (My teacher educator/mentor supports me in the development of a personal development plan) has revealed that student teachers feel to be better supported in creating their personal development plan by their teacher educator than by their mentor. It is probable that a teacher educator knows more about how to create a personal development plan, also because of his/her theoretical background. Maybe a mentor has less knowldege on how to support a student teacher in generating a personal development plan or does not think that this is a task of his or her supervisor role.

Comparing the items describing the support of the teacher educator/mentor in helping student teachers to review their development (5a and 5b), student teachers perceive the support of their supervisor at the institute as better than the support of their supervisor at the practice school. This is equivalent to the preceding result and can be explained in the same manner.

Due to the lack of literature, only assumptions to explain the results can be made here. Further research needs to be conducted to investigate the proposed interpretations and reasons. As no proof by other research is accessible, conclusions and explanations have to be made deliberately. However, it can be concluded that student teachers experience their teacher education institute and their practice school differently as has been revealed by the factor analysis. Oosterheert et al. (2002) have already shown that the perception of different student teacher types of the academic learning environment varies. Based on the notions and anticipations made it is expected that two main reasons are accountable for the difference in perception (see figure 2): (1) the interpretation of the role and therewith related tasks and support by the particular supervisor, (2) the supervisor's practical and theoretical knowledge and therewith related ability to undertake tasks and provide support. The definition a supervisor assigns to his or her role may determine the tasks adopted and exercised and the support provided. The practical and theoretical knowledge owned could influence whether the supervisor is able to give the required support and to fulfil their task.

Interestingly, it became apparent by the discussion of the five selected items that student teachers are (except items 2a and b) more positive about the teacher education institute than about their practice school. The technical steering (relation between theory and practice, creating and reviewing personal development plan) is perceived to be better provided by the teacher educator. A reason for this might be the knowledge the teacher educator might have at his/her disposal on these topics and the way of definition of his or her responsibilities.

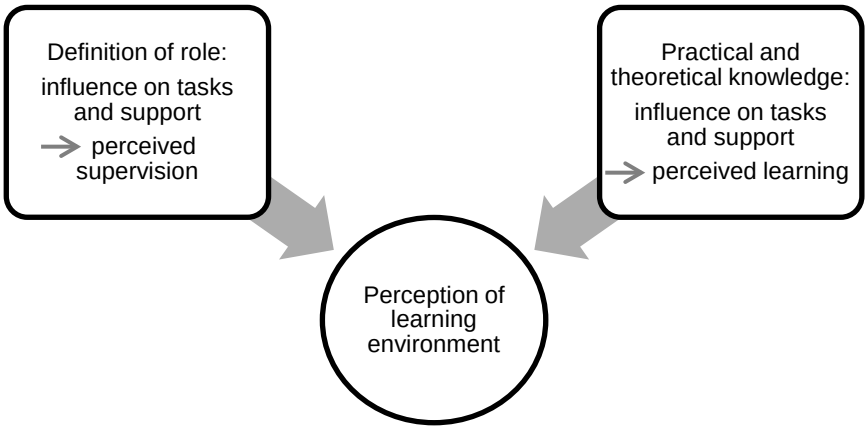

Figure 2. Reasons for the difference in perception of supervision and learning.

The difference in perception of the two learning environments might indicate an experienced friction stemming from how student teachers perceive the learning and the support of their teacher educator or their mentor. Helping student teachers to master this tension seems to be of great importance when wanting to eliminate the theory-practice gap. As it is expected that the inherited role of the supervisors influences the perception of the learning environment, it might be worth involving the student teachers' mentors and teacher educators and in this process. Defining their roles and tasks could lead to a clarification of how the learning of and the support for student teachers would have to be organised to reduce the experienced friction. As Eraut (2004) has shown, between the knowledge and skills needed at work and the knowledge and skills student teachers are provided with at the education institute exists a gap. Aligning the roles of the supervisors could reduce the experienced gap and also match needed and provided skills and knowledge by the school and the institute.

Further research would be needed to explore the theoretical idea of the influence of the supervisors' roles and knowledge to detect practical effects. Ignoring the influence of perception on the theory-practice gap might leads to difficulties like the unpreparedness of young teachers when starting teaching (Kane & Mallon, 2006) and the experienced complexity of teaching (Hagger et al., 2008). As Hammerness et al. (2005) have proven, this might hinder student teachers' development into an adaptive expert. However, in the worst case, the friction might even cause a dropout of the programme.

Limitations and value of the bachelorthesis

Even though this bachelorthesis has some limitations that make the results less generalizable, it has revealed new and interesting insights that prove its value.

Participants. The participants of the studies were from only one student teacher institute in the Netherlands. The sample used in this study is therefore relatively small considering the overall amount of student teachers. A larger number of participants and the inclusion of more teacher education institutes could have led to other results and even conclusions, because of the more of information and data. The results can not just like that be generalised.

Analysis. Even though this study concentrated on learning and regulation activities, only one learning activity (learning strategy) was included. This was because the study of Endedijk et al. (2011) did not include others. The utilisation of other learning activities might have given a more complete picture of learning activities employed. However, the studies reviewed, did not suggest other learning activities.

Conclusion of results. Due to the lack of studies in this area, the conclusions drawn can be only compared limited with other existing studies. This also suggests that new research regarding learning and regulation activities is needed to provide a solid basis of knowledge on student teacher learning in a dual learning environment. This will make results more generalizable.

Value of the study. Besides the limitations, interesting results and conclusions have been found. Student teachers use different learning and regulation activities in different learning environments (see table 16). As proven by this thesis, the learning characters of the different contexts have revealed that learning at the practice school, the teacher education institute and in both contexts always contains formal and informal activities. A dual learning environment thus meets various researchers requirement to make successful learning true by combining theory and practice, formal and informal learning. The results show evidence that a dual learning programme might be the right manner to support student teachers' learning to teach. However, more research on the dual learning environments' effectiveness will have to verify this first impression.

Even though the results of the preceding study have implicated that it is likely that a dual learning environment supports learning to teach in an effective manner, student teachers still experience a gap between theory and practice. With this thesis it has been discovered that they perceive the environments of a dual learning environment differently (see table 12 and 14). This experienced friction might be connected to their supervisors' interpretation of their role. A difference in exercise regarding support and knowledge could be a reason why student teachers perceive the environments differently and therefore also still experience the theory-practice gap. Research will be needed to clarify the rightness of this theoretical assumption.

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Appendix

Appendix A: Questions and multiple choice items of the Structured Learning Report including frequencies (freq) (Endedijk et al., 2011)

1. What did you learn? *Open question, categorised in terms of the following reflections on the learning content:*

	Multiple choice options	Freq	%
A	Reflection on learning content in terms of a rule of thumb.	220	17.0
B	Reflection on learning content in terms of factual knowledge.	302	23.4
C	Reflection on learning content in terms of procedural knowledge.	78	6.0
D	Reflection on learning content in terms of own learning or identity as a teacher.	277	21.4
E	Reflection on learning content in terms of a specific teaching practice.	139	10.8
F	Reflection on learning content in terms of theory of practice.	194	15.0
G	No reflection in terms of learning, only description of an experience.	82	6.3
	Total	1292	100.0

2a. Did you plan to learn this?

	Multiple choice options	Freq	%
A	No, I did not plan to learn this (proceed with question 3).	581	45.0
B	Not specifically for this moment, but I had an intention to learn this.	250	19.3
C	Yes	461	35.7
	Total	1292	100

2b. What was the main reason to learn this?

	Multiple choice options	Freq	%
A	I was unsatisfied about a previous experience.	206	15.9
B	I was curious about something.	95	7.4
C	Others stimulated me to develop myself in this.	125	9.7
D	I wanted to prepare myself for future possible experiences.	92	7.1
E	I wanted to practice with something.	101	7.8
F	Otherwise, namely…	95	7.4
	(skipped, because of an unplanned learning experience)	*578*	*44.7*
		1292	100.0

3. There are different ways to learn things. Not all ways are always applicable to every situation. Please, choose the description that fits your experience best. I learned something by….

	Multiple choice options	Freq	%
A	… I don't know actually.	12	0.9
B	… doing it or experiencing it.	352	27.2
C	… experimenting something.	174	13.5
D	… evaluating what went well and wrong in my lesson or another situation.	93	7.2
E	… analyzing my and others' role in a situation.	85	6.6
F	… getting information.	269	20.8
G	… getting feedback from others.	186	14.4
H	… observing how others do something.	46	3.6
I	Otherwise, namely…	75	5.8
	Total	1292	100.0

4a. Did you choose beforehand this way of learning? *(In the questionnaire, this question is only asked to people who reported a planned learning experience):*

	Multiple choice options	Freq	%
A	No, this was no conscious choice (proceed with question 5).	307	23.8
B	Yes, I thought about that beforehand.	403	31.2
	(skipped, because of an unplanned learning experience)	*582*	*45.0*
	Total	1292	100.0

4b. You just noticed that you chose your way of learning beforehand. Why did you choose THIS way of learning?

	Multiple choice options	Freq	%
A	I don't know.	19	1.5
B	It is not possible to learn it in another way.	125	9.7
C	Someone else suggested to me to learn it this way.	74	5.7
D	This was the easiest or the fastest way to learn it.	75	5.8
E	Compared with other ways of learning, this way of learning often works well for me.	45	3.5
F	Otherwise, namely …	65	5.0
	(skipped, because it was no conscious choice)	307	23.8
	(skipped, because of an unplanned learning experience)	582	45.0
	Total	1292	100.0

7a. When you look back on this learning experience, is there something you are unsatisfied about?

	Multiple choice options	Freq	%
A	No (proceed with question 8)	1029	79.6
B	Yes	263	20.4
	Total	1292	100.0

7b. What are you especially unsatisfied about? Retrospectively,….

	Multiple choice options	Freq	%
A	… I would have wanted to learn this earlier in my development.	86	6.7
B	… I would have wanted to prepare myself better.	31	2.4
C	… I would have wanted to tackle things differently during this experience.	49	3.8
D	… I would have liked to learn this in a different way.	3	.2
E	… I would have wanted my students to behave differently.	25	1.9
F	… I would have hoped that others would cooperate better.	15	1.2
G	Otherwise, namely…	54	4.2
	(skipped, because totally satisfied)	1029	79.6
	Total	1292	100.0

8. How do you proceed with this learning experience?

	Multiple choice options	Freq	%
A	I have no new plans (yet).	121	9.4
B	It did not work out the way I wanted, so I am going to try again.	27	2.1
C	I have exactly figured out what I will do next time in a comparable situation.	76	5.9
D	I want to consolidate what I have learned.	160	12.4
E	I want to improve further what I have learned.	308	23.8
F	I want to apply in practice what I have learned.	367	28.4
G	I want to try out what I have learned in a different situation.	93	7.2
H	Based on what I have learned, I have formulated a new learning goal for myself.	85	6.6
I	Otherwise, namely…	55	4.3
		292	100.0

5a. Did you expect to succeed in learning this? (In the questionnaire, this question is only asked to people who reported a planned learning experience)

	Multiple choice options	Freq	%
A	Yes	220	17.0
B	No	11	0.9
C	I didn't know, but I hoped to succeed (proceed with question 6).	178	13.8
D	I didn't think about that beforehand (proceed with question 6).	55	4.3
	(skipped, because of an unplanned or unintentional learning experience)	828	64.1
	Total	1292	100.0

5b. Why did you expect (not) to succeed in this? *(In the questionnaire, this question is split up in a positive and negative version):*

	Multiple choice options	Freq	%
A	I was (not) confident in myself to succeed.	123	9.5
B	I was well prepared.	42	3.3
C	The last time I learned something in this WAY, it also worked out well/did not work out well.	23	1.8
D	The last time I learned something in this CONTEXT, it also worked out well/did not work out well.	5	0.4
E	Otherwise, namely…	38	2.9
	(skipped, because did not think about it)	233	18.1
	(skipped, because of an unplanned or unintentional learning experience)	828	64.1
	Total	1292	100.0

6. At what moment did you realise that you had learned something?

	Multiple choice options	Freq	%
A	I don't know.	20	1.5
B	The moment I experienced that it worked out well.	266	20.6
C	The moment I experienced that it did NOT work out well.	68	5.3
D	The moment I saw or heard the reaction of others.	107	8.3
E	The moment I received feedback.	147	11.4
F	The moment I reflected on my experience.	165	12.8
G	The moment I realised that I received new information.	232	18.0
H	The moment I became aware of my own behaviour.	97	7.5
I	Otherwise, namely …	36	2.8
	Missing values (due to a mistake in a skip logic)	154	11.9
	Total	1292	100.0

Tables

A: Overview of the scales 1 to 3 used in the Structures Learning Report

Table 2
Scale 1: Constructive communicative press

	Mentor	SPD
1	Mijn mentor organiseert activiteiten waarbij ik aan het denken wordt gezet	Mijn SPD zet mij tijdens onze gesprekken aan het denken.
2	De mentorgroepsbijeenkomsten worden zo opgezet dat ik actief moet participeren	De gesprekken met mijn SPD zijn zo vormgegeven dat ik zelf een actieve rol heb
3	Tijdens mentorgroepsbijeenkomsten is het belangrijk dat ik kan beargumenteren waarom ik denk dat iets zo is	Tijdens gesprekken met mijn SPD is het belangrijk dat ik kan beargumenteren waarom ik denk dat iets zo is
4	Mijn mentor activeert mij voortdurend om een standpunt in te nemen	In een gesprek activeert mijn SPD mij voortdurend om een standpunt in te nemen
5	De mentorgroepsbijeenkomsten worden zo opgezet dat ik steeds geconcentreerd moet blijven op wat er gaande is	Mijn SPD creëert voor mij nieuwe en uitdagende leersituaties.
6	Na een mentorgroepsbijeenkomst heb ik duidelijk het gevoel dat ik iets geleerd heb	Als ik met mijn SPD heb gesproken heb ik duidelijk het gevoel dat ik iets geleerd heb

Table 3
Scale 2: Integrating Theory and Practice

	Mentor	SPD
1	Aan de voorbeelden die mijn mentor geeft kan ik merken dat hij/zij de praktijk van het lesgeven goed kent.	Aan de voorbeelden die mijn SPD geeft kan ik merken dat hij/zij de theorie van het lesgeven goed kent.
2	Tijdens de mentorgroepsbijeenkomsten wordt theorie goed vertaald naar de praktijk	Mijn SPD gebruikt theorie om de praktijk te analyseren
3	Mijn mentor geeft herkenbare voorbeelden als hij/zij iets nieuws behandelt	
4	Bij mijn mentor staat theorie en praktijk los van elkaar (r)	Bij mijn SPD staat theorie en praktijk los van elkaar (r)
5	Mijn mentor geeft helder aan wat de theorie te maken heeft met het lesgeven	Mijn SPD geeft helder aan wat de theorie te maken heeft met lesgeven
6		Mijn SPD legt aan mij uit wat zijn visie is op lesgeven
		Mijn SPD vertelt mij waarom hij op een bepaalde manier lesgeeft

Scale 3: Self-regulation pedagogy
Mijn mentor/SPD biedt mij goede ondersteuning bij…

1. …het vertalen van de rolbeschrijvingen naar mijn eigen leerdoelen
2. …het maken van een persoonlijk ontwikkelingsplan
3. …het bedenken van een goede manier om mijn leerdoelen te bereiken
4. …het bijstellen van mijn doelen tijdens mijn ontwikkeling
5. …het gebruiken van de reflectiecirkel bij mijn ervaringen
6. …het terugkijken op hoe ik mij ontwikkel
7. …het verbinden van verschillende leerervaringen aan elkaar
8. …het vertrouwen in mezelf krijgen als docent
9. …het gemotiveerd raken en blijven voor het docent worden
10. …weten wat er van mij wordt verwacht in de opleiding

B: Results of the parallel factor analysis

Table 4
Parallel factor analysis

	Random Data Eigenvalues			Factor analysis Eigenvalues		
Number of factors	Root	Means	Percentile	Total	% Variance	Cumulated %
1	1.00	1.97	2.09	11.83	27.52	27.52
2	2.00	1.86	1.94	6.69	15.55	43.07
3	3.00	1.77	1.84	2.64	6.14	49.21
4	4.00	1.70	1.76	2.09	4.85	54.064
5	5.00	1.63	1.68	1.90	4.43	58.491
6	6.00	1.57	1.63	1.49	3.46	61.95

C: Results of the Chi-square test

Table 5
Crosstab of regulation activity "motivation", including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		School	Institute	Both	Total
Unintentional	Observed Frequency	544	184	85	813
	Expected Frequency	505.5	198.5	109.0	813.0
	Adjusted Residual	4.0	-1.7	-3.5	
Dissatisfied about previous experience	Observed Frequency	188	28	45	261
	Expected Frequency	162.3	63.7	35.0	261.0
	Adjusted Residual	3.6	-5.6	2.0	
Practice something	Observed Frequency	72	21	23	116
	Expected Frequency	72.1	28.3	15.5	116.0
	Adjusted Residual	.0	-1.6	2.1	
Curious	Observed Frequency	63	59	24	146
	Expected Frequency	90.8	35.7	19.6	146.0
	Adjusted Residual	-5.0	4.7	1.1	
External stimulation from others	Observed Frequency	66	26	26	118
	Expected Frequency	73.4	28.8	15.8	118.0
	Adjusted Residual	-5.0	4.7	1.1	
Preparing	Observed Frequency	55	70	10	135
	Expected Frequency	83.9	33.0	18.1	135.0
	Adjusted Residual	-5.4	7.8	-2.1	
Total	Observed Frequency	988	388	213	1589
	Expected Frequency	988.0	388.0	213.0	1589.0

Table 6
Crosstab of learning activity "learning strategy", including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		School	Institute	Both	Total
Doing/experiencing	Observed Frequency	371	56	49	476
	Expected Frequency	291.8	123.1	61.1	476.0
	Adjusted Residual	8.8	-8.3	-2.0	
Experimenting	Observed Frequency	167	21	44	232
	Expected Frequency	142.2	60.0	29.8	232.0
	Adjusted Residual	3.6	-6.3	3.0	
Evaluating	Observed Frequency	112	3	19	134
	Expected Frequency	82.1	34.7	17.2	134.0
	Adjusted Residual	5.5	-6.5	.5	
Analysing	Observed Frequency	93	14	23	130
	Expected Frequency	79.7	33.6	16.7	130.0
	Adjusted Residual	2.5	-4.1	1.7	
Getting information	Observed Frequency	48	263	33	344
	Expected Frequency	210.9	89.0	44.2	344.0
	Adjusted Residual	-20.3	24.1	-2.0	
Getting feedback	Observed Frequency	178	45	34	257
	Expected Frequency	157.5	66.5	33.0	257.0

	Adjusted Residual	2.9	-3.3	.2	
Observing	Observed Frequency	43	25	10	78
	Expected Frequency	47.8	20.2	10.0	78.0
	Adjusted Residual	1.1	1.3	.0	
Total	Observed Frequency	1012	427	212	1651
	Expected Frequency	1012.0	427.0	212.0	1651.0

Table 7
Crosstab of regulation activity "strategy choice", including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		School	Institute	Both	Total
Not intentional	Observed Frequency	733	328	145	1206
	Expected Frequency	731.6	308.8	165.5	1206.0
	Adjusted Residual	.2	2.4	3.2	
Impossible to learn it in another way	Observed Frequency	118	21	31	170
	Expected Frequency	103.1	43.5	23.3	170.0
	Adjusted Residual	2.5	-4.2	1.8	
Someone else suggested to learn this	Observed Frequency	46	28	20	94
	Expected Frequency	57.0	24.1	12.9	94.0
	Adjusted Residual	-2.4	1.0	2.2	
Easiest or fastest way to learn	Observed Frequency	53	40	13	106
	Expected Frequency	64,3	27,1	14,5	106,0
	Adjusted Residual	-2.3	3.0	-.5	
Compared with other ways of learning this way often works well for me	Observed Frequency	71	14	22	107
	Expected Frequency	64.9	27.4	14.7	107.0
	Adjusted Residual	1.2	-3.1	2.1	
Total	Observed Frequency	1021	431	231	1683
	Expected Frequency	1021.0	431.0	231.0	1683.0

Table 8
Crosstab of regulation activity "monitoring", including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		School	Institute	Both	Total
It worked out	Observed Frequency	269	40	61	370
	Expected Frequency	222.7	97.5	49.7	370.0
	Adjusted Residual	5.6	-7.8	2.0	
It did NOT work	Observed Frequency	98	3	6	107
	Expected Frequency	64.4	28.2	14.4	107.0
	Adjusted Residual	6.9	-5.7	-2.5	
Reaction others	Observed Frequency	133	15	7	155
	Expected Frequency	93.3	40.9	20.8	155.0
	Adjusted Residual	6.9	-5.0	-3.4	
Getting feedback	Observed Frequency	143	48	26	217
	Expected Frequency	130.6	57.2	29.2	217.0
	Adjusted Residual	1.9	-1.5	-.7	
Reflection	Observed Frequency	151	39	48	238
	Expected Frequency	143.3	62.7	32.0	238.0
	Adjusted Residual	1.1	-3.8	3.3	

New information	Observed Frequency	54	226	29	309
	Expected Frequency	186.0	81.5	41.5	309.0
	Adjusted Residual	-17.8	20.9	-2.3	
Realisation	Observed Frequency	79	35	30	144
	Expected Frequency	86.7	38.0	19.4	144.0
	Adjusted Residual	1.4	-.6	2.7	
Total	Observed Frequency	927	406	207	1540
	Expected Frequency	927.0	406.0	207.0	1540.0

Table 9
Crosstab of regulation activity "reflection", including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		School	Institute	Both	Total
Rule of thumb	Observed Frequency	186	38	34	258
	Expected Frequency	155.3	66.9	35.8	158.0
	Adjusted Residual	4.2	-4.4	-.3	
Factual knowledge	Observed Frequency	197	160	40	397
	Expected Frequency	239.0	102.9	55.1	397.0
	Adjusted Residual	-4.9	7.4	-2.5	
Procedural knowledge	Observed Frequency	42	81	16	139
	Expected Frequency	83.7	36.0	19.3	139.0
	Adjusted Residual	-7.5	9.1	-.8	
Change in own learning or identity	Observed Frequency	217	77	70	364
	Expected Frequency	219.1	94.4	50.5	364.0
	Adjusted Residual	-.3	-2.3	3.3	
Teaching practice	Observed Frequency	147	42	43	232
	Expected Frequency	139.7	60.2	32.2	232.0
	Adjusted Residual	1.1	-2.9	2.2	
Theory of practice	Observed Frequency	207	49	35	291
	Expected Frequency	175.2	75.5	40.4	291.0
	Adjusted Residual	4.2	-3.9	-1.0	
No description of learning	Observed Frequency	72	13	8	93
	Expected Frequency	56.0	24.1	12.9	93.0
	Adjusted Residual	3.5	-2.7	-1.5	
Total	Observed Frequency	1068	460	246	1774
	Expected Frequency	1068.0	460.0	246.0	1774.0

Table 10
Crosstab of regulation activity "dissatisfaction", including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		School	Institute	Both	Total
Moment learning took place	Observed Frequency	72	17	28	117
	Expected Frequency	70.6	30.3	16.2	117.0

	Adjusted Residuals	.3	-2.9	3.3	
Preparation	Observed Frequency	23	3	11	37
	Expected Frequency	22.3	9.6	5.1	37.0
	Adjusted Residuals	.2	-2.5	2.8	
Way of approach	Observed Frequency	57	2	8	67
	Expected Frequency	40.4	17.3	9.3	67.0
	Adjusted Residuals	4.2	-4.4	-.5	
Pupils	Observed Frequency	36	0	4	40
	Expected Frequency	24.1	10.4	5.5	40.0
	Adjusted Residuals	3.9	-3.8	-.7	
Totally satisfied	Observed Frequency	807	405	177	1389
	Expected Frequency	837.6	359.5	191.9	1389.0
	Adjusted Residuals	-4.2	7.0	-2.9	
Total	Observed Frequency	995	427	228	1650
	Expected Frequency	995.0	427.0	228.0	1650.0

Table 11
Crosstab of regulation activity "inferences for new learning experiences", including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		School	Institute	Both	Total
No plans	Observed Frequency	86	63	15	164
	Expected Frequency	99.3	42.3	22.4	164.0
	Adjusted Residual	-2.2	3.9	-1.8	
Try again	Observed Frequency	35	6	3	44
	Expected Frequency	26.6	11.4	6.0	44.0
	Adjusted Residual	2.6	-1.9	-1.3	
Concrete plan	Observed Frequency	80	11	10	101
	Expected Frequency	61.2	26.1	13.8	101.0
	Adjusted Residual	4.0	-3.5	-1.1	
Consolidate	Observed Frequency	157	23	24	204
	Expected Frequency	123.5	52.6	27.8	204.0
	Adjusted Residual	5.1	-5.1	-.8	
Further improving	Observed Frequency	313	48	93	454
	Expected Frequency	274.9	117.2	61.9	454.0
	Adjusted Residual	4.3	-8.7	5.0	
Apply/use in practice	Observed Frequency	183	254	49	486
	Expected Frequency	294.3	125.4	66.3	486.0
	Adjusted Residual	-12.2	15.8	-2.7	
Try in another situation	Observed Frequency	92	10	15	117
	Expected Frequency	70.8	30.2	16.0	117.0

	Adjusted Residual	4.1	-4.4	-.3	
Learning goal	Observed Frequency	84	24	23	131
	Expected Frequency	79.3	33.8	17.9	131.0
	Adjusted Residual	.9	-2.0	1.4	
Total	Observed Frequency	1030	439	232	1701
	Expected Frequency	1030.0	439.0	232.0	1701.0

D: Results of the factor analysis with two factors

Table 12
Factor loadings of items representing mentor and teacher educator

Items	Components	
	1	2
CCPS6@6_Als_ik_met_mijn_SPD_heb_gesproken_heb_ik_duidelijk_het_gevoel	.799	. 086
ZDS7@7_het_verbinden_van_verschillende_leerervaringen_aan_elkaar1	.783	.017
ZDS3@3_het_bedenken_van_een_goede_manier_om_mijn_leerdoelen_te_bere1	.772	.134
ZDS6@6_het_terugkijken_op_hoe_ik_mij_ontwikkel1	.763	.117
ZDS4@4_het_bijstellen_van_mijn_doelen_tijdens_mijn_ontwikkeling1	.758	.183
CCPS3@3_Mijn_SPD_vindt_het_belangrijk_dat_ik_tijdens_onze_gesprekken_	.755	.062
CCPS2@2_De_gesprekken_met_mijn_SPD_zijn_zo_vormgegeven_dat_ik_zelf_ee	.735	-.068
CCPS1@1_Mijn_SPD_zet_mij_tijdens_onze_gesprekken_aan_het_denken#	.734	-.046
ZDS2@2_het_maken_van_een_persoonlijk_ontwikkelingsplan1	.720	.192
ZDS1@1_het_vertalen_van_de_rolbeschrijvingen_naar_mijn_eigen_leerdo1	.716	.149
CCPS5@5_Mijn_SPD_creëert_voor_mij_steeds_nieuwe_en_uitdagende_leersit	.713	.211
ZDS9@9_het_gemotiveerd_raken_en_blijven_voor_het_docent_worden1	.677	.014
CCPS4@4_In_een_gesprek_activeert_mijn_SPD_mij_steeds_om_een_standpunt	.677	.171
ZDS8@8_het_vertrouwen_in_mezelf_krijgen_als_docent1	.642	-.064
ITPS1@7_Aan_de_voorbeelden_die_mijn_SPD_geeft_kan_ik_merken_dat_hijz	.606	.195
ITPS6@12_Mijn_SPD_vertelt_mij_waarom_hijzij_op_een_bepaalde_manier_l	.594	.003
ITPS5@11_Mijn_SPD_legt_aan_mij_uit_wat_zijnhaar_visie_is_op_lesgeven	.545	.034
ITPS2@8_Mijn_SPD_gebruikt_theorie_om_de_praktijk_te_analyseren	.536	.114
ITPS4@10_Mijn_SPD_geeft_helder_aan_wat_de_theorie_te_maken_heeft_met_	.526	.100
ZDS10@10__weten_wat_er_van_mij_wordt_verwacht_in_de_opleiding1	.523	.126
ZDS5@5_het_gebruiken_van_de_reflectiecirkel_bij_mijn_ervaringen1	.458	.268
CCPM6@3_Na_een_mentorgroepsbijeenkomst_heb_ik_duidelijk_het_gevoel_da	.065	.760
CCPM4@3_Mijn_mentor_activeert_mij_steeds_om_een_standpunt_in_te_nemen	.133	.710
ZDM6@6_het_terugkijken_op_hoe_ik_mij_ontwikkel	.144	.673
CCPM1@1_Mijn_mentor_organiseert_activiteiten_waarbij_ik_aan_het_denke	-.081	.661
ZDM3@3_het_bedenken_van_een_goede_manier_om_mijn_leerdoelen_te_bere	.093	.659
ZDM1@1_het_vertalen_van_de_rolbeschrijvingen_naar_mijn_eigen_leerdo	-.046	.659
ITPM3@5_Mijn_mentor_geeft_herkenbare_voorbeelden_als_hijzij_iets_nie	.192	.654
ZDM2@2_het_maken_van_een_persoonlijk_ontwikkelingsplan	.004	.649
ZDM9@9_het_gemotiveerd_raken_en_blijven_voor_het_docent_worden	.232	.642
ZDM4@4_het_bijstellen_van_mijn_doelen_tijdens_mijn_ontwikkeling	.124	.642
ZDM8@8_het_vertrouwen_in_mezelf_krijgen_als_docent	.131	.642
ZDM7@7_het_verbinden_van_verschillende_leerervaringen_aan_elkaar	.250	.631
ITPM1@4_Aan_de_voorbeelden_die_mijn_mentor_geeft_kan_ik_merken_dat_hi	.158	.618
ITPM2@1_Tijdens_de_mentorgroepsbijeenkomsten_wordt_theorie_goed_verta	.056	.616

ZDM5@5_het_gebruiken_van_de_reflectiecirkel_bij_mijn_ervaringen	-.119	.595
CCPM2@2_De_mentorgroepsbijeenkomsten_worden_zo_opgezet_dat_ik_steeds_	.036	.590
ITPM5@7_Mijn_mentor_geeft_helder_aan_wat_de_theorie_te_maken_heeft_me	.081	.590
ZDM10@10__weten_wat_er_van_mij_wordt_verwacht_in_de_opleiding	.133	.560
CCPM5@4_De_mentorgroepsbijeenkomsten_worden_zo_vormgegeven_dat_ik_act	.028	.505
CCPM3@2_Mijn_mentor_vindt_het_belangrijk_dat_ik_tijdens_de_bijeenkoms	.150	.495
ITPM4@6_Bij_mijn_mentor_staan_theorie_en_praktijk_los_van_elkaar_(rec)	.022	.389
ITPS3@9_Bij_mijn_SPD_staan_theorie_en_praktijk_los_van_elkaar_(rec)	.212	.282