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Master Thesis

Self-Directed Learning at the Workplace: the Role of Others

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Self-directed learning is closely embedded into employees' daily working life and offers employees rich opportunities to develop themselves in the knowledge economy. The importance of self-directed learning has been recognized in both research and practice. There is no detailed explanation yet about how we can define self-directed learning at the workplace and what activities employees can use to regulate their self-directed learning. This research has focused on the topic: the roles of others in self-directed learning at the workplace. In this research, the literature review gives a theoretical overview of self-directed learning at the workplace. Four perspectives of self-directed learning and their regulation activities are presented in the literature findings. This research has been prepared by Longquan Lin, Dr. Maaike Endedijk, and Drs. Maria Hendriks from the University of Twente. 85 participants come from the context of a dual-education program for pre-service teacher in the Nederland. A learning report was used to collect 1292 regulation experiences from them for the statistical analysis. Empirical findings show that regulation activities are related to support amount, support type, and support sources. The quality of self-directed learning is also connected with support amount, support types, and support sources.

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1 Preface

This study focuses on the topic of the roles of others in self-directed learning at the workplace. It has been prepared by Longquan Lin, Dr. Maaike Endedijk, and Drs. Maria Hendriks in the University of Twente. Both literature review findings and empirical results will be presented in this study. Chapter 1 introduces the research background and general information about self-directed learning. Chapter 2 presents findings for two literature review questions: what are definitions fitting for different perspectives of SDL, and what are regulation activities in different perspectives of SDL. Chapter 3 discusses what we have found in the literature findings, and raises questions for the empirical research. Chapter 4 describes the methodology of the instrument, participants, procedures and data analysis techniques. Chapter 5 tries to answer empirical questions by analyzing 1292 regulation experiences from 85 pre-service teachers of one post-graduate teacher education institute in The Netherlands. Chapter 6 discusses research findings, research limitation, and implications for practice and future research.

Self-Directed Learning at the Workplace: The Role of Others

2 Introduction

2.1 Background

The knowledge economy brings both opportunities and challenges to organizations and employees in the twenty-first century. Firstly, knowledge economy expects organizations to keep improving and learning in order to stay competitive and transform information, knowledge, and opportunities into financial profit and organizational sustainability (Cho & Kwon, 2005). Secondly, knowledge economy also changes the traditional relationship between employees and employers (Raemdonck, 2006). Furthermore, knowledge economy requires employees to take more responsibility to improve their competence and also direct their own career paths (Raemdonck). Thus, in the knowledge economy, the importance of knowledge is self-evident (Ulbrich, Scheir, Lindstaedt, & Gortz, 2006).

Both employees and organizations shall take responsibility for the continuous-development of knowledge. If organizations want to stay competitive in the knowledge economy, their employees' success to self-direct their learning at work is supposed to be one important key (Cho & Kwon, 2005). SDL (self-directed learning) constantly enhances employees' competence while they are still working on their jobs (Ulbrich et al., 2006). This is a challenging but necessary process. Most of the time, employees learn by themselves in their daily work setting or some less informal environments (Campbell, 1991). But, employees should not be just left alone in SDL and organizations shall facilitate employees with supportive organizational settings, resources and opportunities (Confessore & Kops, 1998).

2.2 SDL

There are various definitions for the concept of SDL. Most definitions have tried to describe either its process or SDL employees' characteristics. Among those definitions, Knowles' work, which has been often cited in the process-perspective studies, defined SDL as "the process in which individuals take the initiative, with or without the help of others, in diagnosing their regulation needs, formulating learning goals, identifying human and material resources for regulation, choosing and implementing appropriate regulation strategies and evaluating regulation outcomes" (Knowles, 1975, p. 15). During the SDL process, employees themselves shall have the ability to design, organize, and monitor their SDL activities (Willams, 2010).

SDL happens at the workplace, which is not a formal education institution. In SDL, employees themselves have much control and responsibility to plan and

evaluate their regulation experiences (Willams, 2010). Employees who conduct SDL are often very proactive and self-motivated to initiate and regulate learning activities in their work, which also helps them to solve work-related problems (Gijbels, Raemdonck, & Vervecken, 2010). Taking self-initiative implies that employees themselves shall set their own goals and take control in the regulation process (Gijbels et al.). Employees often have an increasing self-concept and direction when they have more useful experience and resources for their SDL (Raemdonck, 2006).

SDL is a popular topic and there are many other perspectives on the concept. Sometimes researchers use SRL (self-regulated learning) as a synonym of SDL (Loyens, Magda, & Rikers, 2008). On one hand, SRL and SDL share many similar components. Both concepts require employees to follow a goal-guided planning and keep proactive in the regulation process (Loyens et al., 2008). Employees' intrinsic motivation is a crucial element in both SRL and SDL (Loyens et al.). On the other hand, SRL and SDL have some differences in their regulation focuses (e.g., which one focuses on the long-term goals), regulation control (e.g., which one offers employees more control over the regulation process), design of regulation process (e.g., which one gives employees more freedom to design their regulation process), strategy application (e.g., whose strategies can be used directly in other situations) and influences from the regulation environment (e.g., which one encourages employees to create a new learning environment) (Evensen, Salisbury-Glennon, & Glenn, 2001; Hout-Wolters, Simons, & Volet, 2002; Jossberger, Brand-Gruwel, Boshuisen, & van de Wiel, 2010; Loyens et al.). SRL usually takes place in domain-specific situations where strategies employees have used could not be applied to other situations directly (Evensen et al.). SRL is more individual-oriented and SDL is more collective-oriented (Volet, Summers, & Thurman, 2009). For some studies, internal factors (e.g., employees' characteristics) are described as an important component in SRL while external factors (e.g., regulation environment) have more influences in SDL (Loyens et al.). SDL came from the field of adult learning. This study chooses to use SDL instead of SRL because SRL originated from the traditional school setting, while employees' learning at the workplace happens in an informal setting most of times (Jossberger et al., 2010).

2.3 Advantages of SDL

Employees' SDL enables them to develop knowledge for themselves and also for their employers. For employees, SDL helps to transfer more knowledge into daily work, enhances job competence, keeps sustainable employability, and pursues cost-effective career developments (Cho & Kwon, 2005; Raemdonck, 2006; Sitzmann & Ely, 2011). For employers, SDL also fosters more organizational effectiveness, competitiveness, innovation and a better employer-employee relationship (Manz & Manz, 1991; Raemdonck; Ulbrich et al., 2006). One study concluded that "SDL is an essential component of an employee development strategy that both improves individual performance and achieves organizational

goals" (Cho, 2002, p. 467).

Compared to traditional ways of employees' professional development such as formally structured trainings and workshops, SDL can save much time and money for organizations (Cho & Kwon, 2005). With a focus of continuality, SDL does not require employees to invest an intense effort or time within a short period because it is embedded into their daily work (Sitzmann & Ely, 2011). Also, SDL could avoid the disadvantage of knowledge transferring discrepancy which has been often criticized in classroom-based training programs (Sitzmann & Ely). Furthermore, SDL has a bigger possibility to satisfy employees' diverse learning needs and job demand, which shall help to increase the organizational effectiveness in return (Manz & Manz, 1991). In SDL, employees themselves shall always play a very important part by taking different ways such as "self-generation, self-monitoring, self-reflection, and self-assessment" (Loyens et al., 2008, p. 424). Many SDL activities are similar to activities in employee development. "Employee development typically refers to a broader set of activities that have both learning and career development goals, such as talent development, job rotation, degree programs, special courses, and mentoring relationships, to achieve individual and organizational goals" (Y. Park & Jacobs, 2011, p. 438).

2.4 SDL Activities

SDL process usually has three phases: orientation, performance, and reflection (Confessore & Kops, 1998). Employees identify regulation opportunities, analyze information and environmental conditions, select and adjust strategies, and evaluate their regulation experiences (Confessore & Kops). Employees themselves can design SDL activities. Sometimes these activities can differ variously (Loyens et al., 2008). For example, one study focused on identifying regulation needs and goals in the orientation phase (Boekaerts, 1999). But one other study paid more attention to analyzing resources and selecting strategies in the orientation phase (Cho & Kwon, 2005). One study used 8 regulation activities to summarize general SDL elements (Endedijk, 2010).

The orientation phase consists of *self-efficacy, goal orientation*, and *strategic planning* (Endedijk, 2010). Firstly, *self-efficacy* refers to how much confidence employees believe themselves have the capability to successfully carry out SDL activities (Loyens et al., 2008; Schunk, 2005). Secondly, *goal orientation* is among the reasons why employees themselves want to carry out those SDL activities (Schunk; Zimmerman, 2002). *Goal orientation* and *self-efficacy* are also part of SDL. *Goal-orientation* and *self-efficacy* can predict employees' motivation and possible regulation outcomes (Jossberger et al., 2010). Thirdly, *strategic planning* expects employees to make clear smaller goals, list and choose suitable strategies, construct possible procedures, and anticipate possible problems (Ertmer & Newby, 1996). *Strategic planning* also contains how to allocate effort and time. One research showed that *strategic planning* had two benefits for employees: to make the implementation of SDL activities less difficult; to stimulate employees to actually

take actions for their SDL (Ertmer & Newby).

The performance phase consists of *monitoring of the learning process*, and *regulation strategy control* (Endedijk, 2010). Firstly, *monitoring of the learning process* is the real process in which employees have self-awareness and abilities to actually control and manage regulation activities (Loyens et al., 2008). Secondly, *regulation strategy control* means that employees themselves process and analyze information of their regulation tasks. *Regulation strategy control* helps employees to understand their regulation results and to discover deeper meanings or principles (Loyens et al.).

The reflection phase consists of *self-reflection on the regulation outcomes, self-evaluation of the regulation experience,* and *inferences of subsequent regulation experience* (Endedijk, 2010). Firstly, in the *self-reflection on the regulation outcomes*, employees carry out attribution (attributing successful or unsuccessful regulation outcomes to causal reasons) and self-reaction (whether they are satisfied with the regulation outcomes). Secondly, *self-evaluation of the regulation experience* is to evaluate employees' regulation performance with their initial planning and targeted standards (Ertmer & Newby, 1996). Thirdly, *inferences for subsequent regulation experiences* are sometime called as forethought. It can be understood as that, by analyzing future regulation tasks and assessing self-motivation, employees connect current regulation experiences to possible future regulation experiences (Zimmerman, 2002).

2.5 The Roles of Self and Other in SDL

So far, I have discussed the general background of SDL, its definition, advantages and regulation activities. There is still one missing component of SDL we need to know about—people, employees who carry out these activities and other stakeholders who are involved in the SDL process.

The importance of the learner himself in self-directed learning is obvious. Employees themselves have most control and responsibility for their regulation. The regulation process and regulation results of SDL could be influenced by many of their personal factors. In SDL, internal factors are important determinants of their regulation outcomes. Internal factors include task values, goal expectation, perceptions of task, regulation difficulty, and self-efficacy (Jossberger et al., 2010). However, sometimes different persons who have almost same backgrounds and abilities in the same organizations have totally different regulation processes and outcome in their SDL (Latham & Locke, 1991). Thus, this study also raised this common phenomenon and indicated that employees' SDL difference could be much influenced by others (Latham & Locke).

It is commonly recognized that workplace learning involves other stakeholders such as colleagues or supervisors in most cases (Cho, 2002). Employees' SDL at the workplace is not an exception. Employees' SDL is not an isolated individual learning activities (Cho). Employees should involve other people in self-directed learning. A paradox exists since SDL is highly individual-oriented, but employees shall also

involve others. Some studies explored how SDL will be influenced by other people. For example, managers or supervisors also share responsibility in employees' SDL (Campbell, 1991). Managers could have several influences in SDL: first, they shall propose challenging but achievable tasks or projects, in which employees can find regulation opportunities; second, they help to create a supporting and friendly working environment; third, they can give feedback, appraisal or rewards if employees manage to make a big progress in work performance and learning (Campbell). Employees shall have responsibility and control about the regulation activities, content, and strategies, but they also need other people's support (Loyens et al., 2008). "Adult learners can and do seek a variety of ways to gain assistance from others in order to become more self-directed learners" (Cho, 2002, p. 467). Other's support can be measured by support amount, support sources, and source types. Support amount refers to how much support they get during SDL process; support sources refer to whom or what has given them support (e.g., colleagues); support types refer to what support they have received (e.g., direct or indirect feedback). Other's support usually has much variation during the SDL process (Grow, 1991). For example, some employees need a larger amount of support in the beginning of their regulation process than the support amount they need in the later period of their SDL process (Unger, Keith, Hilling, Gielnik, & Frese, 2009).

2.6 Objects of Regulation

In workplace learning, employees improve their work-related information, knowledge and skills (Park & Jacob, 2011). Employees can regulate their job satisfaction, organizational commitment, and work motivation (Park & Jacob). In the past, researchers often regarded SDL as a way for employees' personal development; nowadays, it is increasingly recognized as an effective way to both enhance work performance and personal development (Cho, 2002). Employees can regulate "practical skills, intrapersonal skills, interpersonal skills" (Cofer, 2000, p.3). These skills will improve their work performance. In different situations with different regulation focuses, employees shall regulate their strategies. Employees shall regulate interpersonal skills because sometimes SDL opportunities come from their communication and cooperation with other people. Employees can also regulate their environment. Employees shall consider whether it is necessary to create a new regulation environment in order to conduct an effective application of regulation strategies (Cho). One study summarized some general objects for employees in SDL: reinforce their lifelong learning, problem-solving ability, cooperating and communicating skills, information selection and transformation, discover themselves (Costa & Kallick, 2004).

2.7 Overview of the Study and Research Question

This study will combine both qualitative and quantitative research methods. This is a triangulation mixed method design, which can give us more information

and different perspectives of the subject in order to understand problems better (Swanson & Holton, 2005).

First, we will conduct a literature review as the qualitative method to explore more about employees' SDL at the workplace. More detailed questions of literature review will be discussed in the following paragraph.

SDL has been introduced in the previous paragraphs. Its advantages and importance to employees and organizations in the knowledge economy cannot be neglected. Both employees and others play a role in the regulation. SDL is quite a broad concept. It seems that there might be different definitions, regulation focuses, various activities or objects of SDL. However, we don't know yet how to define different perspectives of SDL at the workplace and what regulation activities they have. Without such a general overview, it is quite difficult for us to have a well understanding about what SDL means to employees at the workplace. So we hope we can answer this with findings from the literature review. Our main question is whether there are different perspectives of SDL at the workplace. It can be split into two sub-questions:

- What are definitions fitting for different perspectives of SDL?
- What are regulation activities in different perspectives of SDL?

3 Literature review

3.1 Literature Review Method

Search terms were formulated by combining "Self-regulated learning OR self-directed learning OR SDL OR SRL OR self-regulation" AND "company* OR business* OR work* OR workplace* OR job* OR organization*". These terms were searched in two sources: databases (ERIC with 40 hits, Web of Science with 54 hits, Scopus with 28 hits), and SAGE Journals with 18 hits (including Human Resource Development Review, Advances in Developing Human Resources, Human Resource Development International, Human Resource Development Quarterly). All articles from databases had been peer-reviewed. The relevance of an article is decided by reading its key words, research question and findings in its abstract. Low relevant articles were excluded after reading abstracts of all 140 hits. Then, most articles found in Google Scholar were overlapping with databases and SAGE Journals. Finally, 6 articles were added after consulting a subject expert. In total, 64 articles were included in two rounds of selection.

3.2 Findings of Literature Review

3.2.1 Task-oriented SDL

Task-oriented SDL has a strong focus on the task level. Task-oriented SD could be defined as employees learn to plan, control and evaluate task-solving strategies in such a way that their desired tasks and regulation outcomes can be achieved

(Jossberger et al., 2010; Pintrich, 2004; Schunk, 2005; Torrano & Gonzelez, 2004; Wolters, Pintrich, & Karabenick, 2005; Zimmerman, 2002). Employees and supervisors anticipate results of targeted tasks, gather facilitating conditions, design and implement their planning (Kremer-Hayon & Tillema, 1999). Employees' SDL on this level is at an unconscious state because they pay more attention to their task achievement process (Nieuwenhuis & Van Woerkom, 2007). In task-oriented SDL, employees do not come up with tasks or set goals themselves. In essence, they are not in control of their task-oriented SDL (Schunk).

One study summarized several underlying assumptions when employees conducted the task-oriented SDL: first, employees did not design their tasks, but they had much control of key activities in their task performance process; second, they were able and willing to regulate their knowledge and behaviors during this process; third, task goals were very important and necessary for them to evaluate their task performance and to regulate SDL if they were also aware of SDL; four, besides personal and organizational factors, their SDL quality would also influence their task performance (Schunk, 2005).

A three-phased SRL process is activated after they receive a clear task. The orientation phase covers task goal setting (or receiving), planning, analyzing self and task; the performance phase is about monitoring, controlling and regulating their task performance; the reflection phase focuses on their reaction toward the task result, and their reflection on the process and themselves (Pintrich, 2004). These three stages follow a chronological order as employees conduct their tasks (Wolters et al., 2005).

3.2.1.1Sub-phases/Regulation Activities

3.2.1.1.1 Orientation

In the orientation phase of task-oriented SDL, employees analyze the task, receive goals, anticipate possible results, formulate an appropriate plan and select suitable strategies for the task (Jossberger et al., 2010). During this preparation process, employees also analyze task requirements and their individual resources in order to predict potential problems (Jossberger et al.).

Among these regulation activities, knowledge activation, strategy selection, and goal-setting are very important for task-oriented SDL. Firstly, knowledge activation refers to analyze their resource and strategies which might be useful of doing their tasks (Torrano & Gonzelez, 2004). Their knowledge could be categorized intro the following three types: task-specific knowledge is about what they know about their tasks, procedural knowledge is about how they can carry out their strategies, and conditional knowledge is about when they can use these strategies (Schunk, 2005). Secondly, strategy selection includes choosing appropriate strategies for their metacognition, cognition, motivation, and behavior (Jossberger

et al., 2010). Thirdly, another important activity is goal-setting. In their planning, employees could set up different levels of goals, among which most of them are performance goals while one or none of these goals might emphasize their learning during the task accomplishment (Torrano & Gonzelez). Often, learning goals are weighed after task performance goals in task-oriented SDL (Zimmerman, 2002). These goals or standards will be used in the monitoring activities during the performance phase (Pintrich, 1999). Some research results showed that, in most cases, task-oriented SDL could be understood as unconscious or even unexpected learning process since employees were unaware of also being learners when they were focusing on performing tasks (Van Eekelen, Boshuizen, & Vermunt, 2005).

3.2.1.1.2 Performance

In the performance phase of task-oriented SDL, employees implement their plans, monitor, adjust behavior to accomplish goals, observe themselves and manage learning process. Among these activities, monitoring is very important because it helps individuals to constantly compare their current performance with their pre-made planning and update things they still need to do in order to achieve task goals (Jossberger et al., 2010). Behavior adjustment usually happens when their pre-made planning is not working as well as they have planned (Jossberger et al.). Behavior adjustment includes re-allocating their effort and time when their task conditions have changed (Schunk, 2005). Employees can evaluate the effectiveness of their selected strategies by conducting self-control and self-observation (Jossberger et al.). These activities help employees to be conscious about the ongoing situation of their tasks, cognition, and motivation (Torrano & Gonzelez, 2004).

Among the activities mentioned in the last paragraph, an explanation of self-control and self-observation is necessary in order to avoid confusion. Self-control applies the chosen strategies from the preparation phase and self-observation records the effect of these strategies (Zimmerman, 2002). “Self-control includes task strategies, imagery, self-instruction, time management, environmental structuring, and help seeking, whereas self-observation includes self-monitoring and self-recording” (Jossberger et al., p. 12). However, in the real practice, it is really difficult for people to differentiate self-control and self-observation during their regulation process (Torrano & Gonzelez, 2004).

3.2.1.1.3 Reflection

In the reflection phase of task-oriented SDL, employees assess their task accomplishment process and outcome, judge the effectiveness of their initial plan, analyze causal attributions, summarize experiences for possible future usages, and

evaluate regulation outcomes (Ertmer & Newby, 1996; Jossberger et al., 2010; Torrano & Gonzelez, 2004; Wolters et al., 2005; Zimmerman, 2008). Activities during the reflection stage usually could provide much feedback about their performance and SDL. Reflection activities are very important if employees want to maintain a follow-up SDL process because these activities can help employees to connect their previous learning experience with the task-performance experience, which could create post-task opportunities for them to learn from practical experience and for possible future task-accomplishment (Jossberger et al.). Among these activities, three frequently-used ones are self-reaction, self-evaluation, and attribution. They will be explained in following three paragraphs.

Firstly, employees will have self-reaction in most cases. Self-reaction can be understood as employees' motivational, behavioral reaction about their task performance and regulation progress (Schunk, 2005). Motivational reaction refers to whether they like the result or not, while behavioral reaction refers to cognitions about their behaviors such as the efficiency of their time (Schunk).

Secondly, employees usually have self-evaluation after self-reaction. Evaluation activities of task performance could be conducted by comparing either to standards from employees and supervisors, or to performance of other employees, even to comparable task which they have done before (Torrano & Gonzelez, 2004; Zimmerman, 2008). Environmental evaluation encourages employees to judge whether the organizational setting is supporting their learning and task performance. If the organizational setting is not supporting, they shall consider whether it needs to be improved for their future regulation experience (Schunk, 2005). Evaluation activities in the reflection phase have a close correlation with self-monitoring activities in the performance phase because they all compare performance with goals and standards from the planning (Pintrich, 1999).

Then, another activity in the reflection phase is attribution. Attribution enables employees themselves to ask questions such as how well their performance is, how good the planning quality is, how many problems has been predicted beforehand, whether their selected strategies are efficient or not, what helps them to accomplish the task, what new knowledge and learning experience they go through. These questions help employees to think about reasons why they have success or failure (Torrano & Gonzelez, 2004).

3.2.2 Interest-oriented SDL

Interest-oriented SDL can be understood as employees select priority tasks for personal or organizational interests, and to direct their own regulation by applying and controlling strategies (Straka, 2010). In the interest-oriented SDL, employees not only receive tasks, but also analyze information and make choices about what and how they want to learn from these tasks (Van Eekelen et al., 2005). Interest-oriented SDL has a bigger chance to fulfill employees' interests. Personal interest, here, can be understood as that employees themselves find out a learning goal between themselves and tasks that they have received, which can encourage

them to apply and control strategies to attain targeted task performance and also SDL regulation results (Straka). Interest will decide the extent to which employees can connect themselves with their tasks (Loyens et al., 2008).

In interest-oriented SDL, employees try to transform assigned tasks and organizational goals into personal goals and learning interests. Employees themselves want to learn and these learning goals are a manifestation of their psychological needs, which may be possible to express in some tasks and impossible to be fulfilled in some other tasks (Boekaerts, 1999). Their self-knowledge, motivation, and affect will also influence how employees value the outcome and guide their own behavior (Straka, 2010). Employees believe that more effort will lead to good learning and performance results, and they value this regulation process (Schunk, 1990). Since they receive assigned task and design learning goals themselves, goal-setting is also an important construct in this level of SDL (Straka). One another study used two directions to describe the goals of employees' interested-oriented SDL, "either to support work performance for personal goals, or to result in innovation, creativity and enhanced capabilities for organizational goals" (Clardy, 2000, p. 116). While the emphasis has been their performance goals in the task-oriented SDL, employees could pay more attention to their learning goals in this interest-oriented SDL (Van Eekelen et al., 2005). Another relevant construct is employees' self-efficacy, which portrays their own perceived personal abilities for learning and performance goals (Schunk).

3.2.2.1Sub-phases/Regulation Activities

3.2.2.1.1 Orientation

Firstly, before they really start regulation behaviors, employees have to identify their regulation needs. Employees specify regulation needs with consideration of both personal (or organizational) interests and environmental conditions. In interest-oriented SDL, employees' learning needs do not emerge automatically; rather they are triggered by the occurrence of multiple tasks (Boekaerts, 1999). From this perspective, it is initiated by expectation or demand of employees' supervisors or other employees (Boekaerts). Employees have a high self-awareness to discover learning opportunities among tasks (Willams, 2010). Employees' motivation level towards learning is not always the same. By transforming assigned tasks into structured learning goals, their motivation can be activated from an unclear level to a clear level (Bedny & Karwowski, 2006).

Secondly, employees' regulation is activated by task weighing instead of task receiving. It could be quite common that employees have a variety of daily tasks and it is doubtable whether every one of these tasks would eventually fit into their SDL process. A weighing of tasks seems to be natural and necessary for their personal or organizational interests. In other words, during interest-oriented SDL

employees still receive tasks, but also analyze information and make choices about what and how they want to learn from these tasks (Van Eekelen et al., 2005).

Then, employees choose their own goals after making a sequence of multiple tasks (Boekaerts, 1999). Goal or task difficulty does not really need to be employees' first criteria to determine their goal structure since employees can build more skill, knowledge, confidence in the solving and performance process than they could imagine in this planning phase (Schunk, 1990). Sometimes difficult but attainable goals can even push employees to spend effort (Schunk). Another characteristic of the goal-setting in the interest-oriented SDL is short-termed while some researches refer to proximal goals, both performance and learning goals (Van Eekelen et al., 2005). Thus, time requirement and deadlines for each task have a bigger influence on employees' structuring of goals (Boekaerts). In the goal-setting process, it is important for them to critically judge importance and urgency of each task (Kremer-Hayon & Tillema, 1999). Goal-setting shall also include setting performance standards because this can stimulate employees' self-efficacy and satisfaction level in the task performance and regulation process (Schunk). Concrete and clear goals and standards have a higher possibility to positively influence their SDL than general, vague goals and standards (Schunk).

In both task-oriented SDL and interest-oriented SDL, task performance is a crucial element; but, they have different regulation focuses (Van Eekelen et al., 2005). In task-oriented SDL, performance goals have a priority; while the interest-oriented SDL has more focus on employees' learning interests and needs (Van Eekelen et al., 2005). In the interest-oriented SDL, learning goals are pursued with "a purposively and consciously controlled planned process" (Van Eekelen et al., p. 450). Employees will spend more effort and commitment as self-made learning goals are interesting for them to learn (Boekaerts, 1999). In the interest-oriented SDL, employees could plan sub-processes for each learning goals and tasks, and employees are active learners who are conscious and aware of their regulation goals and have a proactive will to control the regulation process (Van Eekelen et al.).

3.2.2.1.2 Performance

In the performance phase, they make an order for various regulation needs, modify their working environment for these needs if it is necessary, manage time efficiently, allocate resource and adjust strategies, have self-observation, self-judgment and self-reaction (Van Eekelen et al., 2005). Although learning goals in interest-oriented SDL have been positioned in a high status hierarchically, employees might give them away if these learning goals conflict with performance goals in the process. Conflict refer to when a learning goal is disturbed, employees might change their focus to other goals; thus, this learning goal might be shifted into an unconscious state (Bedny & Karwowski, 2006). Thus, employees shall also

learn how to find a balance in their different tasks and goals in order to avoid goal conflicts in the task solving process (Boekaerts, 1999). A working environment can influentially stimulate or hinder employees' interest-oriented SDL, however, employees can also take up some responsibility to change accordingly and not just passively receive influence from it, namely, by restructuring (Boekaerts). These activities above could be categorized into three constructs in the control phase: sequencing, restructuring, resource management (Straka, 2010). Self-observation, self-judgment and self-reaction help employees constantly make weighing of their needs (Straka).

3.2.2.1.3 Reflection

Firstly, they diagnose problems that has occurred in the learning process and analyze causes in the reflection phase of interest-oriented SDL (Boekaerts, 1999; Schunk, 1990; Straka, 2010; Van Eekelen et al., 2005). "Diagnosis refers to the concluding subjective assessment of the learning result as the difference between the consciously anticipated goal and the actually achieved learning result" (Straka, p. 248).

Secondly, they will have attribution. Their ability and autonomy influence their learning interests and how they design their regulation. In return, employees attribute more of their success or failure of regulation outcome to personal factors in the end (Straka, 2010).

In addition to problem diagnosis and attribution, employees also have self-reaction in the reflection phase. Self-reaction gives them reasons why or why not to reward themselves such as a longer work break (Schunk, 1990).

3.2.3 Job-oriented SDL

Job-oriented SDL refers to employees keep developing their abilities and competences to fulfill job expectations (Guglielmino, Guglielmino, & Long, 1987). Job-oriented SDL has several characteristics: employees themselves will initiate SDL in their jobs; the desired outcomes of SDL fit well with their job requirements; employees take most of the control and responsibility in the regulation (Grow, 1991). In either task-oriented SDL or interest-oriented SDL, their regulation is initiated by tasks. Job-oriented SDL is different because employees themselves could initiate and design their own regulation tasks and goals, identify and choose strategies, implement and evaluate their regulation results (Willams, 2010). The fundamental purpose of job-oriented SDL is to constantly develop their abilities and enhance job-related competence (J. Park & Kwon, 2004).

Their jobs will have much influence on their regulation because most jobs have several social effects on employees: employment relationship, occupational identity, work-group attachments, and interpersonal relationships (Brown, 2001). Furthermore, job demand and job control together shape four types of jobs: active,

passive, high-strain, and low-strain (Gijbels et al., 2010). In general, active jobs can provide most job-oriented SDL opportunities among these four types of jobs (Gijbels et al.; J. Park & Kwon, 2004).

As job-holders, employees have much interaction with other people and their working environment in the job-oriented SDL (Dechant, 1999). Employees, environment, and jobs could be seen as three separated stake-holders during the SDL process: in the environment, there are other employees, supervisors, customers who employees are working together during their daily work life; in their jobs, there are always tasks, assignments, and projects that are waiting for them to accomplish every day. It is by interacting with the external environment that employees learn how to perform their jobs. This study also shows that, for some employees, their supervisors have much control over their regulation by giving specific guidance, assignment direction, goal explanation, skill requirement, strategy advices. Thus, these novice employees gradually become SDL learners along with the process they transform into experienced job-holders (Dechant). Employees are supposed to be qualified for their jobs in the end of job-oriented SDL.

One study provides a description about four types of employees in job-oriented SDL: dependent employees, who act as apprentices to get information, carry out plans and receive feedback from their coaches; autonomous employees, who are motivated to set goals and select strategies to solve their tasks; motivated employees, who design their learning plans and supervisors facilitate the learning process; mature employees, who can learn independently and only consult supervisors when it is necessary (Grow, 1991). Although this differs from the process perspective of this paper, we may understand this as different employees have different levels of awareness and abilities to manage their job-oriented SDL. By job-oriented SDL, employees are supposed to grow from an apprentice who is incompetent and not willing to regulate and grow into an independent worker who is competent and willing to learn (Lindstaedt, Aehnelt, & de Hoog, 2009). Three phases of job-oriented SDL (orientation, performance, and reflection) do not necessarily follow a chronological manner; instead, they are interrelated phases, with which employees' job-oriented SDL keep evolving forwards. Throughout these phases, employees have a growing independence in learning.

3.2.3.1 Sub-phases/Regulation Activities

3.2.3.1.1 Orientation

In orientation phase of job-oriented SDL, some employees are dependent as they are not competent or experienced enough to perform his or her job and independently manage SDL in the workplace (Grow, 1991). This study also indicated that employees often received very direct job or learning instruction by receiving

coaching and mentoring. At the orientation phase, employees receive many learning-by-doing opportunities from their coach or supervisors.

Another component in this phase is employee orientation, in which they get to know more about their jobs and people in their workplace (Brown, 2001). Employees try to learn basic responsibilities and functions which are required by their job descriptions (Nieuwenhuis & Van Woerkom, 2007). Sometimes job changes (e.g., job rotation, job enrichment) can stimulate employees' job-oriented SDL, which could also happen to experienced employees who have a new assigned job in the same organization (Clardy, 2000).

Employees have many experiential learning opportunities to quickly enhance their competence, but most of the real fit between employees and their jobs or job success will largely depend on their own proactivity and awareness to improve their competence from the next phase, and also their ability of learning to regulate (Brown, 2001). This study suggested that organizations shall be patient and facilitate new employees with more SDL before evaluating an employee's job competence, which was usually conducted shortly after new employees entered their organizations (Brown).

Another research's results showed that some employees' job-oriented SDL was often triggered by the gap between working performance and job expectation. "The employee is confronted with the need to learn more but without mandate, guidance, or formal training resources support. As a result, the employee is on his or her own in deciding about learning activities" (Clardy, 2000, p. 110). In this case, we may understand their job-oriented SDL as reactive, instead of proactive.

So we conclude these two different opinions as that job-oriented SDL should be mostly self-initiated and self-managed by employees themselves (Baskett, 1993).

One research found out the success of their orientation phase of job-oriented SDL will be partially caused by employee's previous education or training, which is not really connected with the concept of SDL in this context (Unger et al., 2009).

3.2.3.1.2 Performance

In the performance phase of job-oriented SDL, employee do not just simply follow job instruction from their coaches or mentors any more (Dechant, 1999). They have more regulation autonomy and motivation by interacting frequently and questioning for more explanation from their coach or mentor. Compared to the previous phase, a main difference is the shift from one-way communication to two way communication between employees and coaches. In this way, employees have a clearer self-understanding about target learning results, and more appreciation of direction and help from their coach (Grow, 1991). Sometimes employees will also conduct an evaluation about the quality of their learning environment at this moment (Ellinger, 2004).

Also, one study pointed out the importance of personal factors in job-oriented

SDL (Grow, 1991). Results showed that most employees have confidence, autonomy, ability and knowledge to lead the SDL in their jobs. This research also indicated that employees would increase the value of surrounding working environment. During their interaction or cooperation, they could critically reflect what they could learn from co-workers in their working teams. A close personal relationship between coach and employees plays an important role in SDL, especially providing their support and encouragement (Brown, 2001). Employees will re-define their roles in the interaction with their coaches and they are more self-responsible for their learning, while their supervisors or coaches act as facilitators and will help and motivate them to solve problems (Grow). Their proactive mindset in this phase could be expressed with "identify learning opportunities, show learning initiative, undertake learning activities, and persevere in overcoming barriers to learn" (Gijbels et al., 2010, p. 243).

3.2.3.1.3 Reflection

One research's results showed that employees may reflect their relationships with their colleagues or supervisors in the reflection phase of job-oriented SDL. "The individual takes the initiative and does the planning, but the autonomy to choose how, when, why, what, and where to learn is still basically determined as a result of being an employees and as a result of such other factors as the task to be achieved, deadlines, available time and resources, and relationships with other employees" (Baskett, 1993, p. 7).

Clear regulation goals are supposed to help employees to consciously monitor their learning process and actively ask feedback from others (Unger et al., 2009). In the reflection phase of job-oriented SDL, employees can evaluate their regulation goals, for which they can consult their coaches if they feel necessary (Grow, 1991). This research gave an example: some employees may still have appointments with their coaches or supervisors from time to time to talk about their SDL and working progress and their difficulties if necessary. By doing this, employees could get social support or motivation for their coaches or mentors. Compared to the orientation and performance phases, responsibility and control have been delegated from supervisors to employees. This research also provided research results indicating that at this moment employees should be able to take total responsibility for their job-oriented SDL and working results (Grow).

3.2.4 Career-oriented SDL

In career-oriented SDL, employees have initiative in the designing of their regulation (what, where, when, and how), full control of the regulation process, and total responsibility of the regulation results (Ellinger, 2004). Career-oriented SDL focuses on employees' long-term goals. Employees may still try to conduct career-oriented SDL when they are satisfied with their jobs because they also want

to make advancement for their career development (Clardy, 2000). It contains not only effort-costing individual regulation activities but also a socially collaboration process (Brown, 2001). Some other study also pointed out the importance of collaboration in career-oriented SDL. “Although the primary purpose of SDL has been recognized as personal growth, interaction and collaboration with others can play a very important role in the process” (Cho, 2002, p. 468).

Personal networks and abilities help employees to find opportunities and get projects. Job expectation will help them to make performance goals, while their self-efficacy will direct their personal regulation goals. Employees use career plans to guide individual learning goals and performance goals but their supervisor does not offer regular help, support or guidance in this level of SDL (Gasevic et al., 2004). Their regulation is much influences by their social environment. “Just as people are social beings who are deeply connected to the group, organization, and community to which they belong, so a variety of learning activities are also affected by the social environment—family, community, and workplace” (Cho, 2002, p. 467).

Career-oriented SDL has several underlying assumptions: firstly, employees shall have self-awareness to design and manage their regulation; secondly, employees gather experience and knowledge from their working life, which are important for their SDL; thirdly, their regulation needs are always changing because they have different roles in different times; then, both personal and organizational factors can encourage them to have SDL (Merriam, 2001).

3.2.4.1Sub-phases/Regulation Activities

3.2.4.1.1 Orientation

In the orientation phase of career-oriented SDL, employees decide what (e.g., knowledge, skills), where, when, and how to learn (Ellinger, 2004). Those employees, who try to make advancement in their careers, will find more regulation opportunities to direct their career-oriented SDL (Gijbels et al., 2010). Both learning goals and performance goals are self-designed to improve different competences and broaden social network for developing employees’ careers; gathering information; employees analyze what current and future changes may be in the labor market and how do these changes will influence their careers; find potential career opportunities both inside and outside their companies; confirm the relevance between these opportunities and their real career plans; modify their career plans if this is necessary; specify their strategies (Latham & Locke, 1991; Littlejohn, Margaryan, & Milligan, 2009; Margaryan, Milligan, Littlejohn, Hendrix, & Graeb-Koenneker, 2009; Neault, 2000; Radosevich, Vaidyanathan, Yeo, & Radosevich, 2004; Raemdonck, 2006; Scott, 2006). “These goals may be inspired not only by their current job, but also by their own plans for personal and professional development in order to remain attractive on the labor market”

(Nieuwenhuis & Van Woerkom, 2007, p. 68). Employees need to embed their career-oriented SDL in a context, and a supporting organizational environment is important here because it could help employees to identify personal and organizational learning goals such as advices from peer employees (Gasevic et al., 2004).

Goal-setting is an important activity in the orientation phase of career-oriented SDL. There are learning goals, performance goals, social goals, career goals, and organizational goals. Firstly, employees' career plan can be specified with learning goals and performance goals, (Gasevic et al., 2004). Learning and performance goals can help to explain activities in career-based SDL. Employees are more persistent, adaptive, self-efficacious, enthusiastic towards challenging learning goals, which help them to enhance their competence and pay more attention to the learning process; and performance goals help them to fulfill self and other's expectation, very often done by comparing with other employees (Radosevich et al., 2004). Their learning and performance goals could be one significant reason when they attribute their performance success or failure because their energy, motivation and value will be influenced by their goals during their performance process (Latham & Locke, 1991). Secondly, another different kind of goals in career-oriented SDL refer to employee's social goals during their networking process, which could be defined as "desires to achieve a particular social outcome and influence achievement in their own right, as well as together with learning goals" (Gasevic et al., p. 507). For achieving their social goals, employees need to share information and knowledge, cooperate with other employees or management, and hold a positive view of the interaction process (Gasevic et al.; Radosevich et al., 2004). Thirdly, employee's commitment to regulate will be influenced by the match between their personal goals and organizational goals. For this, employee and employer shall negotiate an appropriate career development plan together. Employer shall be open-minded and they will understand that employee's career development and learning are actually beneficial and very important to the organizational performance (Neault, 2000). According to one research, employee's career-oriented SDL is important for organizations to maintain competitiveness and flexibility in the knowledge economy and it is already very rare to see organizations offering life-time contracts for their employees, thus, how shall employee plan and develop their career remains as a challenge (Neault). For this study, collaborative relationship differs from the traditional way of contacting both psychologically and legitimately. Collaboration between employee and employer is proposed in the literature. Employer shall provide resources and tools, but employees should be responsible for their careers (Neault). To summarize, in the career-oriented SDL, goal-setting will be all self-designed by employees. In this case, employees have full control over their learning.

Finding their career identities is also an important activity in the orientation phase of career-oriented SDL. Career identity could be understood as "a portion of the self is active and directing achievement-related activities" (Lord, Diefendorff,

Schmidt, & Hall, 2010, p. 551). Almost all employees (both new employees and senior employees) will try to construct their future career identity (either short-term or long-term) in career-oriented SDL. Identity construction starts from the very beginning of their working life. Employees consider the economic value and competitiveness that they can make in the long run of their career life (Nieuwenhuis & Van Woerkom, 2007).

Only finding career identity is not enough for career-oriented SDL. It is also necessary for employees to have self-directness for career-oriented SDL. The motivation and initiative shall really come from employees themselves (Clardy, 2000). One study points out that employee's self-directness is a fundamental construct in career-oriented SDL (Raemdonck, 2006). According to this, self-directedness in career-oriented SDL can be defined as adaptive reaction towards changing labor market and intentional implementation of career plans. Its several characteristics have been described as: being unsteady, proactive, interactive with requirements from organization and labor markets, future-oriented, and continuous. Self-directedness can be influenced by both personal factors (e.g., gender, age, ethnicity, desire of mobility, formal education, previous working experience, career plans) and organizational factors (e.g., job challenge, job conditions, HR policies, learning opportunities, organizational support, work environment) (Raemdonck).

In career-oriented SDL, employees shall have a good ability of decision-making with the availability of a large number of regulation opportunities, which may give them an overloaded amount of information. Employees are free and autonomous to make decisions in the career-oriented SDL. They often want to make a maximum regulation result by giving up some of their sub-goals and opportunities. For doing this, it is important for them to clearly understand what they really want in their SDL. In principle, their long-term learning goals and career plans shall have a priority than short-term goals and opportunities (J. Park & Kwon, 2004).

3.2.4.1.2 Performance

In the performance stage of career-oriented SDL, employees will develop knowledge, skill and network to fulfill their goals, especially know more information about key persons who they think are important to develop their career plans right now; carry out the specified strategies (Raemdonck, 2006).

Both the process and results are important in the concept of career-oriented SDL. In the process, employees independently and autonomously direct their regulation with plans, goals and criteria; for the result, they need to show whether they really reach their performance goals, learning goals, and social goals (Margaryan et al., 2009).

In the career-oriented SDL, employees pay much attention to their personal social network, especially people from their workplace. For SDL employees, they

build a collaborative learning environment, which they analyze and place themselves into a certain position (Ellinger, 2004). “People learn at work by participating in various working practices, collaborating with colleagues and clients and meeting new challenges” (Tynjala, 2008, p. 150). Employees begin to value the quality of collaboration with others and they are more concerned about how others can help them with useful knowledge, skills, information, and potential career opportunities. “They introduce new knowledge into the environment through collaborative informal learning, communities of practice enable individuals engaging in SDL to enhance group Knowledge” (Confessore & Kops, 1998, p. 371).

Collaboration can be understood as an important element in employees’ career-oriented SDL. “While internal networks (neural structures within individuals’ minds) are necessary in creating understanding, it is the external networks that allow an individual to tap into the collective in order to continually find, generate, create, filter and connect new knowledge” (Littlejohn et al., 2009, p. 209). Collaboration could be in the individual-level or in the group-level. “Although the primary purpose of SDL has been recognized as personal growth, interaction and collaboration with others can play a very important role in the process” (Cho, 2002, p. 468). Firstly, individual level of collaboration is very common. When employees are competent to perform their own jobs, they shall all have certain individual expertise. If they can collaborate with each other, employees could form a helpful social network which could give them new knowledge to develop their careers (Littlejohn et al.). Collaboration with others helps employees to get more subjective feedback and they can discover more learning needs or opportunities in the collaborative process (Dechant, 1999). This is another level of help-seeking, which is not problem-oriented but future-oriented because they are more conscious to connect their work plans and future career goals with other people (Margaryan et al.). Secondly, sometimes regulation is embedded in their group-level collaboration activities with other employees or supervisors (Willams, 2010). SDL begins to shift from the personal-oriented regulation to group-oriented regulation (Margaryan et al., 2009). “It should be understood as a mode of learning in which an individual identifies his/her own learning needs, looks for proper learning resources, manages the learning process and evaluates the results without regard to place or distance” (J. Park & Kwon, 2004, p. 334). Employees and employer should support each other to create a friendly working environment.

Nowadays more and more organizations start to pay attention to employees’ development needs in careers, for which their internal HR managers could develop various career development plans, conduct career assessment offer career advices in order to satisfy employees’ need and organizations’ long term development goals (Neault, 2000). Employees would have more career-oriented SDL in organizations who encourages them to be creative, innovative, collaborative, and also respectful, trustworthy to each other; but less career-oriented SDL in a downsizing organization (Confessore & Kops, 1998). Relevant organizational policies shall be made to support employees’ learning needs and sustainable employability, especially their

mid-aged employees. Common practice could be promotions, more flexible working time, changing job requirements, more communicative meetings, clear and timing feedback and evaluation in order to give them commitment, motivation, time, or resources for their SDL (Neault). In some research results, one purpose of the performance phase in career-oriented SDL was to find more opportunities and people who can offer information, cooperation or help for their regulation (Margaryan et al., 2009).

3.2.4.1.3 Reflection

Reflection activities are an important component in career-oriented SDL. Employee's reflective ability is determined by "personality type, learning style preference, cognitive style, past experiences" (Jennings, 2007, p. 521). There are two types of reflective activities: reflection-during-performance and reflection-after-performance (Jennings). A large number of researchers are focusing on the first one because of four reasons. Firstly, employees tend to ignore their mistakes or problems in reflection-after-performance; secondly, career-oriented SDL requires employees be responsible of both the process and its result; thirdly, reflection-after-performance might lower employee's efficiency to reflect because some employees set very long-term goals which may take years of time (Jennings); last but not least, evaluation and reflection could be rich sources to motivate employees (Karoly, 1993).

In career-oriented SDL, employees are assumed to have maximum autonomy and freedom to decide their regulation content, time and strategy. In the reflection phase, employees need to question themselves that whether they have been really autonomous to do so during the process (Baskett, 1993).

Employees can also evaluate whether these people give useful feedback or suggestions because career-oriented SDL is really embedded into their social interaction with their teammates or other organizational members (Confessore & Kops, 1998).

In the reflection phase of career-oriented SDL, employees will evaluate how they respond in the performing process, what they like and dislike in this process, reflect their motivation and satisfaction changes, and change their overall career goals if this is necessary (Gasevic et al., 2004; Karoly, 1993; Klein, 1989; Latham & Locke, 1991; Littlejohn et al., 2009; Radosevich et al., 2004). However, reflection activities in career-oriented SDL do not necessarily follow a pre-made sequence, rather its various activities are often interconnected (Margaryan et al., 2009).

3.3 Conclusion of the Literature Review

3.3.1 Task-oriented SDL's Phases /Important Activities

In task-oriented SDL, employees focus on their task competence. In the

orientation phase, task strategies include metacognitive, motivational, behavioral, and cognitive strategies (Jossberger et al., 2010). Task knowledge could be categorized intro three types: task-specific knowledge is about what they know about their tasks, procedural knowledge is about how they can carry out their strategies, conditional knowledge is about when they can use these strategies (Schunk, 2005). In the orientation phase, they analyze tasks, set (receive) goals and standards. They have both performance goals and learning goals. Compared to learning goals, performance goals have a priority to them in this level of SDL (Torrano & Gonzelez, 2004; Zimmerman, 2002). Main activities in the performance phase include self-controlling, monitoring, observing, and recording (Jossberger et al.; Schunk; Torrano & Gonzelez; Zimmerman). In the reflection, employees could evaluate their task performance, learning process and environment (Schunk; Torrano & Gonzelez; Zimmerman).

3.3.2 Interest-oriented SDL's Phases /Important Activities

In interest-oriented SDL, employees focus on interest discoveries. In the orientation phase, employees sequence multiple tasks considering time requirement or deadlines, and choose their own goals (Boekaerts, 1999). Their motivation is activated from an unclear level to a clear level by transforming assigned tasks into structured learning goals (Bedny & Karwowski, 2006). Concrete, clear goals and standards have a higher possibility to positively influence their self-directed learning than general, vague goals and standards (Schunk, 1990). In the performance phase, they make an order for various learning needs, modify their working environment for these needs if this is necessary, manage time efficiently, allocate resource and adjust strategies, have self-observation, self-judgment and self-reaction (Van Eekelen et al., 2005). Restructuring and resource management help to create a learning environment (Straka, 2010). Self-observation, self-judgment and self-reaction help employees constantly make weighing of their needs (Straka). In the reflection phase, they diagnose problems occurring in the learning process and analyze causes (Boekaerts; Schunk; Straka; Van Eekelen et al.). The reflection phase also includes attribution and self-reaction, which give reasons why or why not to reward themselves such as a longer work break (Schunk).

3.3.3 Job-oriented SDL's Phases /Important Activities

In job-oriented SDL, employees focus on improving their job competence. By receiving coaching and mentoring in the orientation phase, some employees often get very direct job or learning instruction. There are many learning-by-doing opportunities in this phase, but in this way these employees are not in control of their learning goals and their learning needs cannot be met most of time (Grow, 1991). A close personal relationship between coach and employees plays an important role in SDL, especially providing their support and encouragement (Brown, 2001). In the performance phase, as some employees are more

autonomous and motivated, thus, they interact more frequently and question more explanation from their supervisor, coach or mentor (Dechant, 1999). In the reflection phase, clear learning goals and process (either self-made or jointly designed with supervisors earlier), are now evaluated and this will help employees to consciously monitor their follow-up learning processes and actively ask feedback from others (Unger et al., 2009).

3.3.4 Career-oriented SDL's Phases /Important Activities

In career-oriented SDL, employees focus on their employability. In the orientation phase, main regulation activities include goal setting, social networking, information gathering, analyzing changes in labor market, finding potential career opportunities, career planning modification, regulation strategy specification (Latham & Locke, 1991; Littlejohn et al., 2009; Margaryan et al., 2009; Neault, 2000; Radosevich et al., 2004; Raemdonck, 2006; Scott, 2006). In the performance stage, employees will develop knowledge, skill and network to fulfill their goals, carry out the specified strategies (Raemdonck). Employees build a collaborative learning environment (Ellinger, 2004). Employees get more subjective feedback and discover more learning needs or opportunities in the collaborative process (Dechant, 1999). The performance phase may also include reflection-during-performance activities (Jennings, 2007). In the reflection phase, reflection-after-performance activities include evaluating how they respond in the performing process, what they like and dislike, reflect their motivation and satisfaction changes, and change their overall career goals if this is necessary (Gasevic et al., 2004; Karoly, 1993; Klein, 1989; Latham & Locke; Littlejohn et al.; Radosevich et al.). An overview of four levels of SDL is given below (See Table 1).

Table 1

An Overview of Four Levels of SDL

	Task	**Interest**	**Job**	**Career**
Definitions	Employees learn to plan, control and evaluate task-solving strategies in such a way that desired tasks and learning can be achieved.	Employees select priority tasks for personal or organizational interests and direct their own learning by applying and controlling strategies.	Employees keep developing their abilities and competences to fulfill job expectations.	Employees decide what, where, when, and how to learn while they use career plan to guide individual learning goals and performance goals.
Focuses	Task accomplishment	Interest discoveries	Job competence	Employability
Important activities in each sub-phase: **Orientation**	Analyze tasks Set performance goals and standards	Sequence tasks Set learning goals	Receive coaching and mentoring	Analyze changes in labor market Modify career plans Design both learning goals and

									performance goals
	Performance		Self-regulation of performance behaviors Self-controlling, monitoring, observing		Adjust learning needs Restructure environment Manage resource		Interact with supervisors Require information		Collaborate with others Network for possible opportunities Carry out career plans
	Reflection		Performance evaluation		Diagnose problems Attribute causes		Evaluate learning goals and process Ask feedback for follow-up learning		Evaluate performance process Reflect personal changes in career development

We wanted to know whether there are different levels of SDL at the workplace and how shall we define them, and what activities employees use to regulate their SDL. Literature review findings have given a positive answer to the main question: there are different levels of SDL at the workplace. There are indeed four levels of SDL existing at the workplace: task-oriented SDL, interest-oriented SDL, job-oriented SDL, and career-oriented SDL. Findings provide definitions and regulation activities help us to understand these four levels. We found that SDL is not just an internal learning process employees have individually. Both personal regulation activities and social embedded regulation activities have been found. Each level of SDL has a different regulation focus: task competence, interest discoveries, job competence, and employability. With a process-perspective, we have structured and discussed these four levels. Four levels of SDL at the workplace have three phases: orientation, performance, and reflection. There are different kinds of goals existing in employees' SDL: performance goals, learning goals, organizational goals, and social goals. In the first two levels, performance goals and tasks have more priority; in the other two levels, learning goals and development have more priority. However, information about the role of others in SDL is still missing, although it has been confirmed by literatures findings that employees have quite much interaction and collaboration with others in SDL, especially in job-oriented SDL and career-oriented SDL. It is worthwhile for the empirical research to find more information about this.

4 Empirical Questions

From the literature, we have an overview of SDL. Four levels of SDL exist at the workplace, with different regulation focuses: task learning, interest discovering, job advancement or career development. There are various regulation activities.

However, we don't have much information about the role of others in SDL. Nowadays many organizations begin to have much investment in employees' SDL. Organizational performance and employees' working performance would closely relate to employees' SDL quality. It is necessary to improve the quality of employees' SDL. If we know more about the role of others, we can facilitate employees' SDL better in the future. We want a sample of employees who have very intense regulation activities and contain most SDL elements. Also, this sample shall fit with our research time. A very nice example would be pre-service teachers, who have a transitional education program which prepares them for teaching later on. An explanation of pre-service teacher's SDL is necessary here. Pre-service teacher is sometimes used inter-changeably with student teacher or beginning teacher. Pre-service teacher usually refers to students who are taking education programs, training and teaching practices, in order to prepare their future teaching profession (Rampai & Sopeerak, 2011). Also, pre-service teacher includes new teachers who do not have much teaching experience, "a beginning teacher is a teacher with fewer than three years' teaching experience since graduation from their teacher education programs" (Pendergast, Garvis, & Keogh, 2011, p. 45). Learning, practicing and reflecting are the three most important elements in pre-service teacher's SDL (Chen, 2012). The data of this research was collected from pre-service teachers in a dual program, in which they conducted SDL through practical teaching and university learning (Endedijk, 2010).

The quality of SDL in pre-service teachers can be analyzed with two dimensions of regulation experiences: passive verse active; and retrospective verse prospective. Passive regulation means that someone else, instead of pre-service teachers themselves, are controlling the regulation content, process (active, vice versa); retrospective regulation means that pre-service teachers have few panning or goal-setting activities and pay more attention to monitoring, evaluation and reflection activities (Endedijk, 2010).

With this way of division, SDL experiences could be categorized into four kinds: passive prospective regulation, active prospective regulation, passive retrospective regulation, and active retrospective regulation. In passive prospective regulation, someone else makes most of choices for the regulation while pre-service teachers do not participate in the planning. Their regulation focuses on the beginning phase. In active prospective regulation, pre-service teachers control their regulation process. The beginning phase still attracts most of their focus while the reflection phase does not. In active retrospective regulation, pre-service teachers spend much effort on the planning, but they are very active in evaluation and reflection activities. In passive retrospective regulation, pre-service teachers usually do not plan their SDL regulation and SDL achievement is dependent on intuitive realization instead of deliberate evaluation or reflection (Endedijk, 2010).

In the previous introduction, we discussed that SDL was not necessarily individual learning. Not only employees but also other stakeholders shall be involved in SDL. Literature review findings showed that employees often have social

interaction and collaboration with others during their SDL process, especially in the job-oriented SDL and career-oriented SDL. It is safe to conclude that others shall also play a role and support employees' SDL. Many researchers have studied how do employees' personal factors influence their SDL, but there is not much research about influence of other's support in SDL quality. Thus, it is worthwhile for the empirical research to focus on how other's support influence employees' SDL. Other's support refers to the support amount, support sources, and support types that pre-service teacher received. Support amount refers to how much support they get during SDL process; support sources refer to whom or what has given them support; support types refer to what support they have received. This study will research on the relationships among other's support, regulation activities, and SDL quality. To research SDL in pre-service teachers, the empirical research question can be formulated as: how do pre-service teachers involve others in the SDL? It can be split into seven sub-questions:

- How much support do pre-service teachers get?
- What sources of support do pre-service teachers use?
- What types of support do pre-service teachers get?
- What are the relationships between different sources of support and types of support?
- How does other's support vary through pre-service teachers' dual program?
- What are the relationships between other's support and different regulation activities?
- What are the relationships between other's support and the quality of pre-service teachers' SDL?

5 Method

5.1 Reliability and Validity of the Instrument

This instrument is developed by Dr. Endedijk in her dissertation (Endedijk，2010). The following two paragraphs summarize its development process.

Firstly, Open Question Learning Report collects qualitative data and it serves as the preliminary version of instrument. 28 participants, who are students from a Dutch dual teacher education program, provide 133 learning experiences with Open Question Learning Report. This instrument's reliability, internal consistency and construct validity are checked. The reliability of this instrument is checked for the categorization of the qualitative data and the internal consistency of the instrument. For this, inter-rater reliability and Cronbach's alpha are calculated. Construct validity is checked by comparing data structure with similar studies. With satisfactory results, Open Question Learning Report can be used to develop the Structured Learning Report (Endedijk, 2010).

Then, the Structured Learning Report is developed on the basis of Open Question Learning Report. It uses eight same variables but multiple choice items for

each question. Four student teachers participate in a pilot test and some small adaptations are made afterwards. A web-based questionnaire of the Structured Learning Report is made for student teachers (Endedijk, 2010). In this questionnaire, there are 8 questions. Questions 1 to 8 are measuring 8 regulation activities: self-reflection on the SDL outcomes, goal orientation, self-efficacy, strategic planning, SDL strategy control, monitoring of SDL results, self-evaluation of SRL experiences, and inferences of subsequent SDL experiences. They all have nominal values. These 8 questions could be also analyzed multiple classification analysis (MCA) and this resulted in two dimensions of the quality of SDL, in terms of regulation passiveness and retrospectiveness (Endedijk, 2010). Passiveness of regulation and retrospectiveness of regulation have scale values. In addition, there is one more question in the questionnaire measuring other's support to pre-service teacher's SDL with three sub-variables (support amount, support sources, and support types). Support amount has scale values, while support sources and support types have nominal values. The development of their program could be tracked with measurement moments. These following questions can be found in the appendix 3.

Table 2

Variables and Codes

Variables	Codes	Variables	Codes
SDL Quality	SQ	*SDL Activities*	RA
● Passiveness of Regulation	PR	● Self-reflection on the learning outcome	SLO
● Retrospectiveness of Regulation	RR	● Goal Orientation	GON
Other's Support	OS	● Self-efficacy	SEY
● Support Sources	SS	● Strategic Planning	SPG
● Support Amount	SA	● Regulation Strategy Control	RSC
● Support Types	ST	● Monitoring of the Learning Process	MLP
Measurement Moments	M M	● Self-evaluation of the Learning Experience	SLE
		● Inferences for Subsequent Learning Experiences	ISE

Table 3

Variables and Questionnaire

Variables	Values	Questions from the Structured Learning Report (see appendix)
SLO	Nominal	Q1, What did you learn?
GON	Nominal	Q2, Did you plan to learn this, and if so, why did you want to learn this?
SEY	Nominal	Q3, Did you expect to succeed in learning this and what made you think you would (not) succeed in learning this?
SPG	Nominal	Q4, How did you learn this?
LSC	Nominal	Q5, Why did you learn it in this way?

MLP	Nominal	Q6, How did you realize that you had learned something?
SLE	Nominal	Q7, If you look back, about which aspects are you satisfied and what would you do differently next time?
ISE	Nominal	Q8, How will you proceed with this learning experience?
OS	Nominal	Q9, Did you get any support in this learning experience or did you learn it totally by yourself? If yes, by whom did you receive support? What kind of support did you receive?

5.2 Participants and Procedure

85 participants, who are full-time student teachers from one post-graduate teacher education institute in The Netherlands, join in this research. Among them, 22 are male and 63 are female. Participants are invited to describe their regulation experiences in online Structure Learning report. In each of 3 time periods, 6 regulation experiences are recorded (two regulation experiences in teacher education institute, two in practice school, and two of teachers' free choice). Participants are instructed to report planned (or unplanned) and successful (or unsuccessful) regulation experiences. There are totally 1292 regulation experiences (75 participants in the first period, 71 participants in the second period, and 69 participants in the third period) (Endedijk, 2010).

5.3 Data Analysis

The following questions from the Structured Learning Report are selected to measure three variables in this research (see Table 4). This research will use SPSS to analyze the quantitative data of online questionnaires. Graphs, Correlation test, Kruskal-Wallis test, and Chi-square will be used to measure the relationships among variables mentioned in the previous table. More analysis tests will be used to answer these four research questions. Firstly, 5 variables are needed to research relationships between other's support (SA, SS, and ST) and SDL quality of (PR, and RR). Correlation tests (SA & PR, and SA & RR) and Kruskal-Wallis tests (SS & PR, SS & RR, ST & PR, and ST & RR) will be used. Secondly, Chi-square test will be used to research relationships between support sources and support types (SS & ST). Thirdly, relationships of SDL activities (with 8 sub-variables) and support amount will be analyzed by Kruskal-Wallis tests (RA & SA). Chi-square tests will be used to analyze for relationships between SDL activities and support sources (RA & SS), and also for relationships between SDL activities and support types (RA & ST). Then, Kruskal-Wallis (SA & DP) and chi-square tests (SS & DP; ST & DP) will be used to analyze variation of other's support through pre-service teacher's dual program.

Table 4

Empirical Questions and Tests

RQ1: What support amount do pre-service teachers get
Tests: Statistical descriptive; Kolmogorov-Smirnov test for SA.

RQ2: What kinds of support do pre-service teachers get?
Tests: Statistical descriptive; Chi-square test for ST.
RQ3: What sources of support do pre-service teachers get?
Tests: Statistical descriptive; Chi-square test for SS.
RQ 4: What are the relationships between other's support and the quality of pre-service teachers' SDL?
Tests: SA & PR, SA & RR—Correlation test; SS & PR, SS & RR—Kruskal-Wallis test; ST & PR, ST & RR—Kruskal-Wallis test.
RQ 5: What are the relationships between different sources of support and types of support?
Tests: SS & ST—Chi-squares.
RQ 6: What are the relationship between other's support and different SDL activities?
Tests: SA & RA—Kruskal-Wallis test; SS & RA—Chi-square; ST & RA—Chi-square.
RQ 7: How does other's support vary through the program?
Tests: SA & DP—Kruskal-Wallis test; SS & DP—Chi-square; ST & DP—Chi-square.

6 Result

6.1 Descriptive Analyses of Passiveness of Regulation, Retrospectiveness of Regulation, Support Amount, and SDL Quality

Table 5 gives an overview of three continuous variables: support amount, passiveness of regulation, and retrospectiveness of regulation. In total, 1292 regulation experiences were collected. In general, pre-service teachers did not receive a very large amount of support (*M* = 1.50, *SD* = 1.68). The mean of scores in passiveness of regulation is 0.00, and the mean of scores in retrospectiveness of regulation is 0.12.

Table 5
Description of Passiveness of Regulation, Retrospectiveness of Regulation, Support Amount

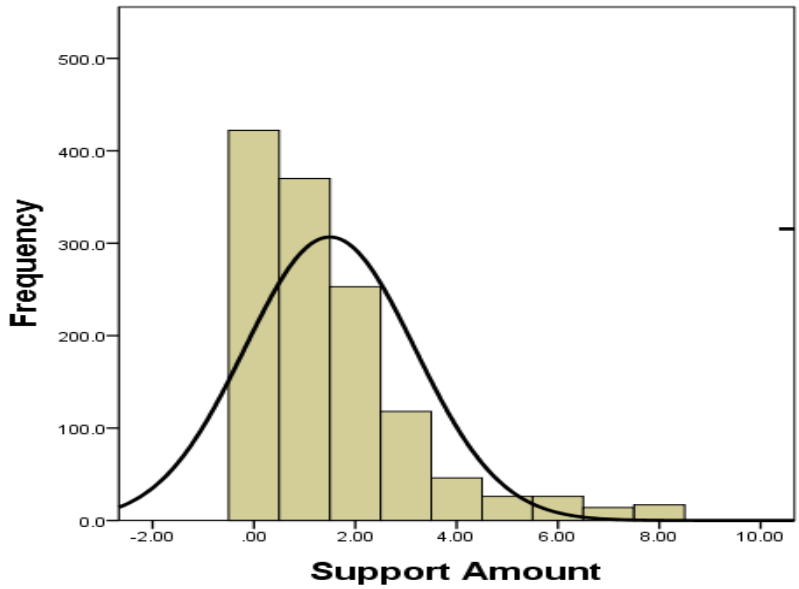
Variables	N	Minimum	Maximum	Mean	Std. Deviation
Passiveness of Regulation	1292	-2.09	3.65	0.00	1.17
Retrospectiveness of Regulation	1292	-2.06	7.33	0.12	1.21
Support Amount	1292	0.00	8.00	1.50	1.68

Furthermore, the normality distributions of these three variables were checked by Kolmogorov-Smirnov Test. Test results indicated that there were no normal distributions in support amount ($t(1292) = .23$, $p = .00$) (See Table 6). For the support amount: 423 regulation experiences (32.7%) did not receive any support at

all, 370 regulation experiences (28.6%) received 1 support, and 254 regulation experiences (19.6%) received 2 supports (See Table 7). Test results also showed that there were no normal distributions in passiveness of regulation ($t(1292) = .14$, $p = .00$), retrospectiveness of regulation ($t(1292) = .12$, $p = .00$) (See Table 6). The left-skewed distribution of these three variables can be seen very clearly in the spreads (See Graph 1, 2, & 3).

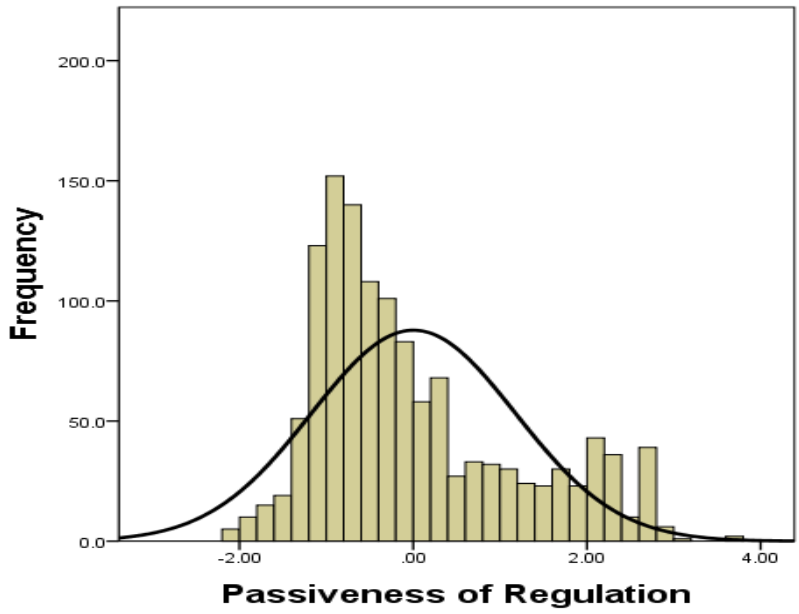
Graph 1

Spread of Support Amount



Graph 2

Spread of Passiveness of Regulation



Graph 3

Spread of Retrospectiveness of Regulation

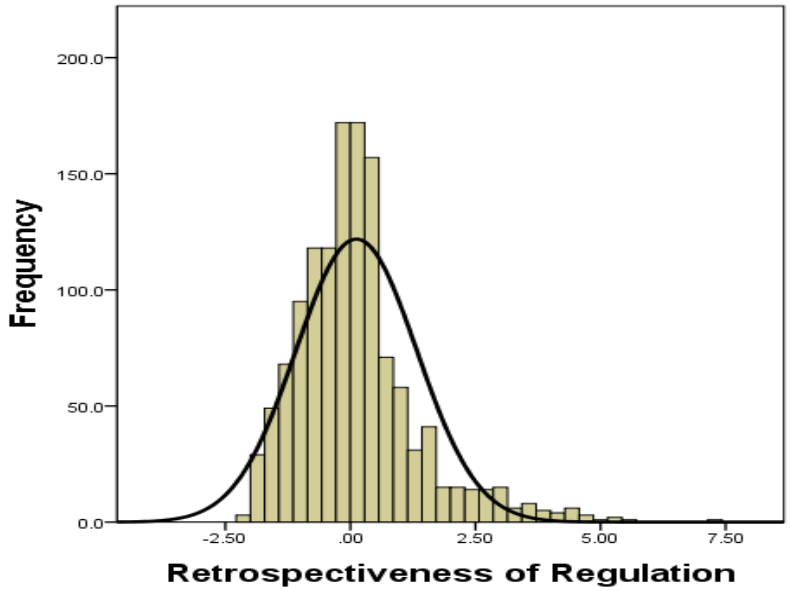


Table 6

Kolmogorov-Smirnov Analyses of Passiveness of Regulation, Retrospectiveness of Regulation, Support Amount

Categories	df	t	p
Passiveness of regulation	1292	.14	.00**
Retrospectiveness of regulation	1292	.12	.00**
Support amount	1292	.23	.00**

Note.** Significant on the p= .01 level

Table 7

Overview of Support Amount

Categories		N	Colum N%
Support Amount	.00	422	32.7%
	1.00	370	28.6%
	2.00	253	19.6%
	3.00	118	9.1%
	4.00	46	3.6%
	5.00	26	2.0%
	6.00	26	2.0%
	7.00	14	1.1%
	8.00	17	1.3%

Table 8 gives frequencies and percentages of two categorical variables: *support*

sources and *support types*. Firstly, of the support, 284 (14.7%) regulation experiences received from colleagues, 100 (5.2%) from family or friends, 306 (15.8%) from general educators, 125 (6.5%) from materials, 347 (17.9%) from mentors, 344 (17.8%) from peers, 212 (11.0%) from pupils, and 216 (11.2%) from subject educator. It is very obvious that regulation experiences did not have an equal distribution among 8 *support sources*. Secondly, of their support, 747 (38.6%) regulation experiences received from direct feedback, 215 (11.1%) from indirect feedback, 634 (32.8%) from information, 173 (8.9%) from emotional support, and 165 (8.5%) from collaboration. Regulation experiences did not have an equal distribution among 5 *support types*, either.

Table 8

Frequency and Percent of Support Sources, and Support Types

Support Sources			Support Types		
Variables	Frequency	Percent	Variables	Frequency	Percent
Colleagues	284	14.7	Direct Feedback	747	38.6
Family or friends	100	5.2	Indirect Feedback	215	11.1
General Educator	306	15.8	Information	634	32.8
Materials	125	6.5	Emotional Support	173	8.9
Mentor	347	17.9	Collaboration	165	8.5
Peers	344	17.8	Total	1934	100.0
Pupil	212	11.0			
Subject Educator	216	11.2			
Total	1934	100.0			

6.2 The Relation between Support Sources and Support Types

Chi-square analyses showed that the association between support sources and support types was significant, $\chi^2(28, \mathrm{N} = 1934)$ = 1798.43, p = .00 (See Table 10). The significance of their association can be further analyzed with the adjusted residuals (Field, 2005). Table 11 gives a crosstab of support sources with support types, including observed frequency (OF), expected frequency (EF), and adjusted residuals (AR). Many residuals lied outside ± 3.29 and were significant on the p value of 0.01 (See table 11). From family or friends, pre-service teachers received more emotional support than expected (OF = 69, EF = 8.9, AR = 21.6), but they received less direct feedback (OF = 20, EF = 38.6, AR = -3.9) and information than expected (OF = 7, EF = 32.8, AR = -5.6). From general educators, they got more information than expected (OF = 145, EF = 100.3, AR = 5.9), but they received less indirect feedback (OF = 7, EF = 34.0, AR = -5.4) and collaboration than expected (OF = 7, EF = 26.1, AR = -4.3). From material, they had much more information than expected (OF = 111.3, EF = 41.0, AR = 14.2). From mentors, they received more direct feedback than expected (OF = 230, EF = 134.0, AR = 12.8), but they received

less indirect feedback (OF = 8, EF = 38.6, AR = -5.8) and information than expected (OF = 55, EF = 113.8, AR = -7.4). From peers, they had more collaboration than expected (OF = 84, EF = 29.3, AR = 11.6), but they got less information than expected (OF = 66, EF = 112.8, AR = -5.9). From pupils, they received much more indirect feedback than expected (OF = 140, EF = 23.6, AR = 27.0), but they received less direct feedback expected (OF = 55, EF = 81.9, AR = -4.0), information (OF = 7, EF = 69.5, AR = -9.7), and emotional support than expected (OF = 3, EF = 19, AR = -4.1). From subject educators, they received more information than expected (OF = 157, EF = 70.8, AR = 13.3), but they received less direct feedback (OF = 46, EF = 83.4, AR = -5.5), indirect feedback (OF = 1, EF = 24, AR = -5.3) and emotional support than expected (OF = 4, EF = 18.4, AR = -3.7).

Table 10

Chi-square Analyses of the Relation between Support Types and Support Sources

Category	df	N	χ^2	P
Support Types and Support Sources	28	1934	1798.43	.00**

Note.**Association is significant on the p= .01 level

Table 11

Crosstab of Support Sources with Support Types, including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		DF	IF	I	ES	C	Total
Colleagues	Observed Frequency	108	30	84	24	38	284
	Expected Frequency	109.7	31.6	93.1	25.4	24.2	284.0
	Adjusted Residual	-.2	-.3	-1.2	-.3	3.2	
Family or friends	Observed Frequency	20	4	7	69	0	100
	Expected Frequency	38.6	11.1	32.8	8.9	8.5	100.0
	Adjusted Residual	-3.9**	-2.3	-5.6**	21.6**	-3.1	
General Educator	Observed Frequency	134	7	145	13	7	306
	Expected Frequency	118.2	34.0	100.3	27.4	26.1	306.0
	Adjusted Residual	2.0	-5.4**	5.9**	-3.1	-4.3**	
Materials	Observed Frequency	5	1	113	2	4	125
	Expected Frequency	48.3	13.9	41.0	11.2	10.7	125.0
	Adjusted Residual	-8.2**	-3.8**	14.2**	-3.0	-2.2	
Mentor	Observed Frequency	239	8	55	24	21	347
	Expected Frequency	134.0	38.6	113.8	31.0	29.6	347.0
	Adjusted Residual	12.8**	-5.8**	-7.4**	-1.5	-1.8	

Peers	Observed Frequency	140	24	66	30	84	344
	Expected Frequency	132.9	38.2	112.8	30.8	29.3	344.0
	Adjusted Residual	.9	-2.7	-5.9**	-.2	11.6**	
Pupils	Observed Frequency	55	140	7	3	7	212
	Expected Frequency	81.9	23.6	69.5	19.0	18.1	212.0
	Adjusted Residual	-4.0**	27.0**	-9.7**	-4.1**	-2.9	
Subject Educator	Observed Frequency	46	1	157	8	4	216
	Expected Frequency	83.4	24.0	70.8	19.3	18.4	216.0
	Adjusted Residual	-5.5**	-5.3**	13.3**	-2.9	-3.7**	
Total	Observed Frequency	747	215	634	173	165	1934
	Expected Frequency	747.0	215.0	634.0	173.0	165.0	1934.0

Note.**Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level

DF = Direct Feedback, IF = Indirect Feedback, I = Information, ES = Emotional Support, C = Collaboration

6.3 The Relation between Other's Support and Measurement Moments

Table 12 gives means, maximums, minimums, and standard deviations of support amount that pre-service teacher received through the development of program (collected by 3 measurement moments). The means of support amount in 3 measurement moments were 1.74, 1.34, 1.39 respectively (See Table 12). Kruskal-Wallis analysis showed that support amounts among 3 measurement moments were not significantly different, $\chi^2(2, N=1292) = 5.57$, p = .06 (See Table 13). Mann-Whitney analyses were used to further check pair-wise comparisons. Analyses showed that support amounts from measurement moment 1 and 2 were significantly different, Z = -2.04, p = .04 (See Table 14). Support amounts from measurement moment 1 and 3 were significantly different, Z = -2.01, p = .04) (See Table 14). Support amounts from measurement moment 2 and 3 were not significantly different, Z = -.04, p = .97 (See Table 14).

Table 12

Descriptive of Support Amount in Measurement Moments

Measurement Moments	Mean of Support Amount	Maximum of Support Amount	Minimum of Support Amount	Standard Deviation of Support Amount
1	1.74	8.00	.00	1.95
2	1.34	7.00	.00	1.41

3	1.39	8.00	.00	1.58

Table 13

Kruskal-Wallis Test of Support Amount in 3 Measurement Moments

	Measurement Moments	N	Mean Rank	df	χ^2	P
Support Amount	1	455	678.61	2	5.57	.06
	2	426	629.36			
	3	411	628.72			
	Total	1292				

Table 14

Mann-Whitney Analyses of Support Amount in Measurement Moments

	Z	P
Measurement Moment 1 VS 2	-2.04	.04*
Measurement Moment 1 VS 3	-2.01	.04*
Measurement Moment 2 VS 3	-.04	.97

Note.*Difference is significant on the p = .05 level

Chi-square analyses showed that the association between support sources and measurement moments was not significant, $\chi^2(14, N = 1934) = 20.22$, $p = .12$ (See Table 15). The insignificance of their association can be further analyzed from adjusted residuals (Field, 2009). Table 16 gives a crosstab of support sources with measurement moments, including observed frequency, expected frequency, and adjusted residuals. We found that in the measurement moment 3, pre-service teachers got more support from general educators than expected (OF = 111, EF = 90.5, AR = 2.8). Except this, most adjusted residuals lied inside ± 2.58 and not significant on the $p = .05$ level (See Table 16).

Table 15

Chi-square Analyses of Support Sources and Measurement Moments

Category	df	N	χ^2	P
Support Sources*Measurement Moments	14	1934	20.22	.12

Table 16

Crosstab of Support Sources with Measurement Moments

Categories		MM1	MM2	MM3	Total
Colleagues	Observed Frequency	108	88	88	284
	Expected Frequency	116.4	83.6	84.0	284.0
	Adjusted Residual	-1.1	.6	.6	

Family or friends	Observed Frequency	45	32	23	100
	Expected Frequency	41.0	29.4	29.6	100.0
	Adjusted Residual	.8	.6	-1.5	
General Educator	Observed Frequency	109	86	111	306
	Expected Frequency	125.5	90.0	90.5	306.0
	Adjusted Residual	-2.1	-.6	2.8*	
Materials	Observed Frequency	53	31	41	125
	Expected Frequency	51.3	36.8	37.0	125.0
	Adjusted Residual	.3	-1.2	.8	
Mentor	Observed Frequency	153	105	89	347
	Expected Frequency	142.3	102.1	102.6	347.0
	Adjusted Residual	1.3	.4	-1.8	
Peers	Observed Frequency	144	90	110	344
	Expected Frequency	141.1	101.2	101.7	344.0
	Adjusted Residual	.4	-1.5	1.1	
Pupils	Observed Frequency	91	64	57	212
	Expected Frequency	86.9	62.4	62.7	212.0
	Adjusted Residual	.6	.3	-.9	
Subject Educator	Observed Frequency	90	73	53	216
	Expected Frequency	88.6	63.5	63.9	216.0
	Adjusted Residual	.2	1.5	-1.7	
Total	Observed Frequency	793	569	572	1934
	Expected Frequency	793.0	569.0	572.0	1934.0

Note.*Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level

MM1 =Measurement Moment 1, MM2 = Measurement Moment 2, MM3 = Measurement Moment 3

The result of Chi-Square analyses showed that the association between *support types* and *measurement moments* was not significant, $\chi^2(8, N = 1934) = 3.56$, $p = .89$ (See Table 17). The insignificance of their association can be further analyzed from individual residuals (Field, 2009). Table 18 gives a crosstab of *support types* with *measurement moments*, including observed frequency, expected frequency, and adjusted residuals. All adjusted residuals lied inside ±2.58 and were not significant on the $p = .05$ level (See Table 18).

Table 17

Chi-square Analyses of Support Types with Measurement Moments

Category	df	N	χ^2	P
Support Types*Measurement Moments	8	1934	3.56	.89

Table 18

Crosstab of Support Types with Measurement Moments, including Observed Frequencies, Expected Frequencies and Adjusted Residuals

Categories		MM1	MM2	MM3	Total
Direct feedback	Observed Frequency	306	227	214	747
	Expected Frequency	306.3	219.8	220.9	747.0
	Adjusted Residual	.0	.7	-.7	
Indirect feedback	Observed Frequency	91	58	66	215
	Expected Frequency	88.2	63.3	63.6	215.0
	Adjusted Residual	.4	-.8	.4	
Information	Observed Frequency	252	194	188	634
	Expected Frequency	260.0	186.5	187.5	634.0
	Adjusted Residual	-.8	.8	.1	
Emotional support	Observed Frequency	70	48	55	173
	Expected Frequency	70.9	50.9	51.2	173.0
	Adjusted Residual	-.2	-.5	.7	
Collaboration	Observed Frequency	74	42	49	165
	Expected Frequency	67.7	48.5	48.8	165.0
	Adjusted Residual	1.1	-1.2	.0	
Total	Observed Frequency	793	569	572	1934
	Expected Frequency	793.0	569.0	572.0	1934.0

Note. MM1 =Measurement Moment 1, MM2 = Measurement Moment 2, MM3 = Measurement Moment 3

6.4 The Relation of Other's Support and SDL Quality

Table 19 provides frequencies of regulation experiences in different support amounts. From this overview, we know a majority of pre-service teachers received *support amount* of 0 to 4. Table 20 provided means of SDL quality when pre-service teachers received different amounts of support. ANOVA analyses showed that there were significant differences in *passiveness of regulation* when pre-service teacher received different amount of support, F (8, 1283) = 15.07, p = .00. Also, there were significant differences in *retrospectiveness of regulation* when they received different amount of support, F (8, 1283) = 2.65, p = .01 (See Table 21).

Since we have found significant differences among groups, post hoc tests will be used to further investigate which groups are different.

Firstly, pre-service teachers had active regulations when they did not get any support at all. They regulation was more passive when they had support amounts of 1, 2, or 3. Their regulation became more active again when they received support amounts of 4, 5, 6, 7, or 8 (See Appendix 2). From the plots (see Graph 2), we can see very clearly that their regulation was even more active when they received support amounts of 4, 5, 6, 7, or 8, than when they did not get any support at all. However, post hoc results did not show evidence about this difference. Maybe this is due to low frequencies in large amounts of support. All support amounts from 5 to 8 had less 30 in their frequencies.

It will be nice to refresh the definition of being retrospective before we

continue. Retrospective regulation means that pre-service teachers have few panning or goal-setting activities and pay more attention to monitoring, evaluation and reflection activities (Endedijk, 2010).

Secondly, pre-service teachers had more perspective regulations when they did not receive any support from others at all. Their regulations were more retrospective when they received support amounts of 1 to 6, than. Post hoc results showed that scores in retrospectiveness were similar when their received support amounts from 1 to 6. Post hoc showed that their regulations were very perspective when they received a very large amount of support (support amount = 7 or 8), although we shall also be aware of their low frequencies here. This can be also seen very clearly in the Graph 3.

Table 19

Frequencies of Regulation Experiences with Different Support Amounts

	Support Amount								
	0	1	2	3	4	5	6	7	8
Regulation Experiences	422	370	253	118	46	26	26	14	17

Table 20

The Relation of Support Amount and SDL Quality

Categories	Support Amount								
SDL Quality	0	1	2	3	4	5	6	7	8
Passiveness of Regulation	.05	.28	.16	.17	.11	.08	.42	-.07	-.48
Retrospectiveness of Regulation	-.34	.30	.35	.13	-.54	-.53	-.59	-.45	-.48
N	422	370	253	118	46	26	26	14	17

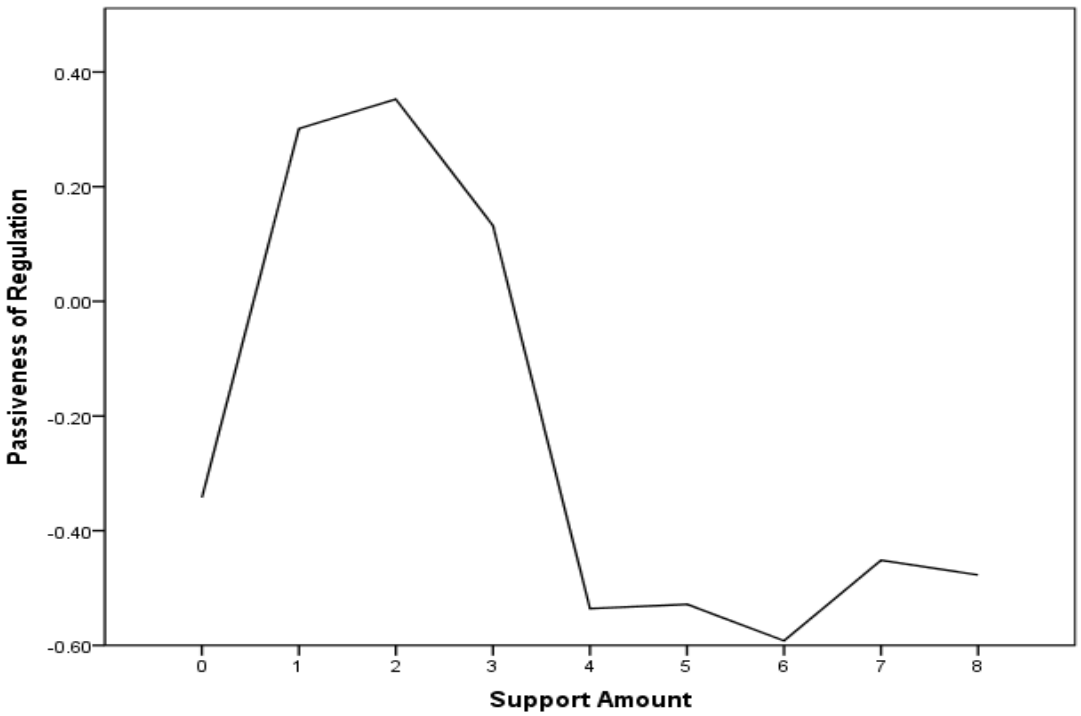
Table 21

ANOVA test of the Relations between Support Amount and SDL Quality

Categories		Sum of Squares	df	Mean Square	F	P
Passiveness of Regulation	Between Groups	152.87	8	19.12	15.07	.00
	Within Groups	1626.44	1283	1.27		
	Total	1779.31	1291			
Retrospectiveness of Regulation	Between Groups	30.66	8	3.83	2.65	.01
	Within Groups	1853.80	1283	1.45		
	Total	1884.46	1291			

Graph 2

The Relation of Support Amount and Passiveness of Regulation



Graph 3

The Relation of Support Amount and Retrospectiveness of Regulation

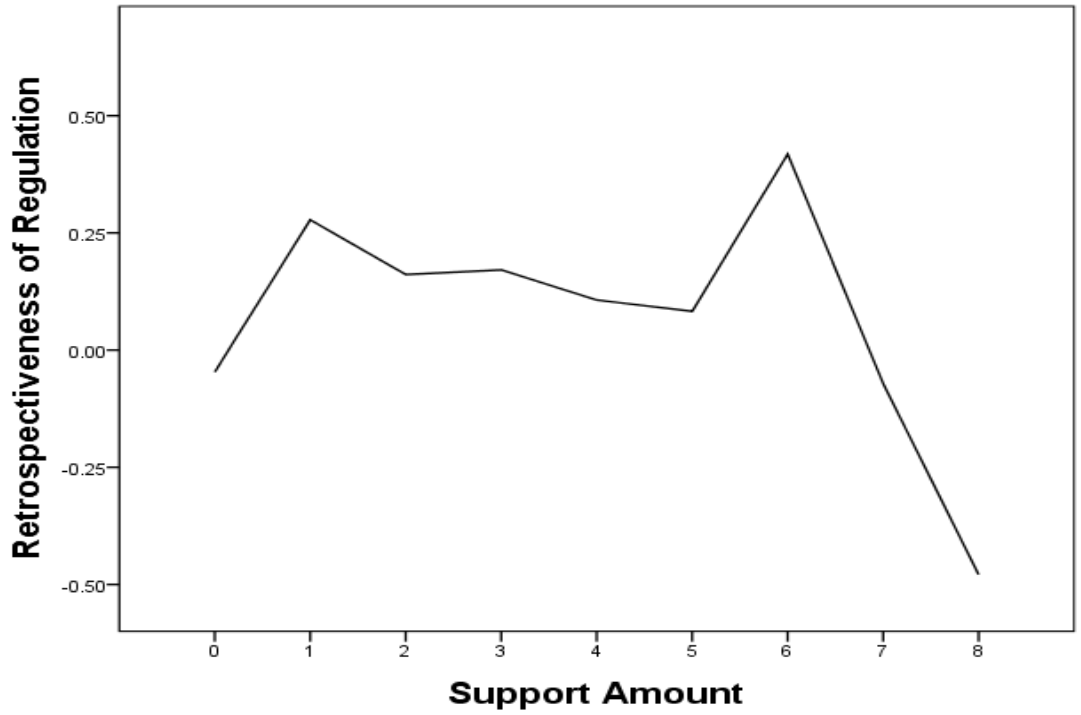


Table 22 gives an overview of the relationships between *support sources* and *SDL quality*. Pres-service teachers had different scores in *SDL quality* when they received support from different sources. Kruskal-Wallis analyses showed that when pre-service teachers had significantly different scores in *passiveness of regulation* when they received support from different sources, $t(7) = 191.59$, $p = .00$ (See Table

23). Their regulations were more passive when they received support from material (*M* = 0.67) and subject educator (*M* = 0.64). They had more active regulations when they received support from family or friend (*M* = -0.62). Kruskal-Wallis analyses showed that pre-service teachers had no significantly different scores in retrospectiveness of regulation when they received support from different sources, *t*(7) = 11.15, *p* = .13 (See Table 23).

Table 22

The Relation between Support Sources and SDL Quality

Categories		Passiveness of Regulation	Retrospectiveness of Regulation
Support Sources	Colleagues	-.17	.11
	Family or friends	-.62	.39
	General Educator	.11	.24
	Materials	.67	-.12
	Mentor	-.45	.21
	Peers	.20	.12
	Pupil	-.42	.15
	Subject Educator	.64	-.03

Table 23

Kruskal-Wallis Tests for the Relation of Support Sources and SDL Quality

Categories	df	Z	p
Support Sources and Passiveness of Regulation	7	191.59	.00**
Support Sources and Retrospectiveness of Regulation	7	11.15	.13

Note.** Difference is significant on the p = .01 level

Table 24 gives means of SDL quality when pre-service teachers received different types of support. Kruskal-Wallis tests were used to check whether there was significant difference of SDL quality when they received different types of support. If yes, Mann-Whitney tests were used to detect differences in pair-wise comparisons.

Kruskal-Wallis analyses showed that when pre-service teacher received different types of support, their scores in *passiveness of regulation* were significantly different, *Z*(4) = 11.30, *p* = .00 (See Table 25). From the ranking of Kruskal-Wallis result, we know that pre-service teachers had significantly higher scores of *passiveness of regulation* when they received information instead of receiving emotional support. Kruskal Wallis analyses showed that when pre-service teacher received different types of support, their scores in *retrospectiveness of regulation* were significantly different, *Z*(4) = -3.75, *p* = .00 (See Table 25). Pre-service teachers had significantly higher scores in *retrospectiveness of regulation* when they received emotional support instead of having collaboration

with others.

Table 24

The Relation between Support Types and SDL Quality

Categories		Passiveness of Regulation	Retrospectiveness of Regulation
Support types	Direct feedback	-.41	.28
	Indirect feedback	-.45	.07
	Information	.68	-.06
	Emotional support	-.65	.58
	Collaboration	.30	-.10

Table 25

Kruskal-Wallis Tests of the Relations between Support Types and SDL Quality

Categories	df	Z	p
Support Types and Passiveness of Regulation	4	11.30	.00**
Support Types and Retrospectiveness of Regulation	4	-3.75	.00**

Note.** Difference is significant on the p = .01 level

6.5 The Relations between Other's Support and Regulation Activities

Kruskal-Wallis tests were used to detect whether there were different support amounts among groups. If there were differences, Mann-Whitney analyses were used to detect differences in pair-wise comparisons.

6.5.1 The Relations between Support Amount and Regulation Activities

Kruskal-Wallis analyses showed that others did not provide different amounts of support when pre-service teachers had different *self-efficacies*, $\chi^2(5) = 3.21$, $p = .67$ (See Table 26). Except *self-efficacy*, results of Kruskal-Wallis Test between other regulation activities and support amount were significant on the $p = .05$ level (See Table 26). The highest rank and the lowest rank of support amount in each regulation activity will also be described. The following paragraph will present the relations between support amount and regulation activities.

Kruskal-Wallis analyses showed that pre-service teachers received significantly different amounts of support when their *goal orientations* were different, $\chi^2(5) = 15.27$, $p = .01$. They received a larger amount of support when they were curious about something, rather than when they were unsatisfied with a previous

regulation experience. Kruskal-Wallis analyses showed that pre-service teachers had significantly different amounts of support when they had different *strategic planning*, $\chi^2(7) = 63.62$, $p = .00$. They received significantly a larger amount of support when others gave them feedback, rather than when they were experimenting something. Kruskal-Wallis analyses showed that pre-service teachers had different amounts of support when they had different *monitoring of the learning processes*, $\chi^2(7) = 35.49$, $p = .00$. They received a larger amount of support when they had feedback, rather than when they realized that they had new information. Kruskal-Wallis analyses showed that they had different amounts of support when their *regulation strategy controls* were different, $\chi^2(5) = 17.75$, $p = .00$. They received a larger amount of support when others suggested a way to learn, rather than when they chose the easiest or the fasted way to learn. Kruskal-Wallis analyses showed that they had different amounts of support when they had different *self-reflections of the learning outcomes*, $\chi^2(6) = 13.90$, $p = .03$. They received a larger amount of support when they reflected on the procedural knowledge, rather than when they had no description of their learning. Kruskal-Wallis analyses showed that they received different amounts of support when they had different *self-evaluations of the learning experiences*, $\chi^2(5) = 27.01$, $p = .00$. They received a larger amount of support when they wanted to prepare themselves better, rather than when they wanted others to cooperate better. Kruskal-Wallis analyses showed that they received different amounts of support when they had different *inferences for subsequent learning experiences*, $\chi^2(7) = 37.53$, $p = .00$. They received a larger amount of support when they wanted to apply new knowledge, rather than when they wanted to consolidate their learning results.

Table 26

Kruskal-Wallis Tests for Regulation Activities and Support Amount

Categories	df	χ^2	p
Self-efficacy*Support Amount	5	3.21	.67
Goal orientation*Support Amount	5	15.27	.01*
Strategic planning*Support Amount	7	63.62	.00**
Regulation strategy control*Support Amount	5	17.75	.00**
Monitoring of the learning process*Support Amount	7	35.49	.00**
Self-reflection of regulation results*Support Amount	6	13.90	.03*
Self-evaluation of regulation experience*Support Amount	5	27.01	.00**
Inference of subsequent learning experiences*Support Amount	7	37.53	.00**

Note.*Difference is significant on the p = .05 level; Strategic planning ** Difference is significant on the p = .01 level;

6.5.2 The Relations between Support Sources and Regulation Activities

Chi-square analyses showed that associations between *support sources* and most *regulation activities* are significant, excluding *self-efficacy* (χ^2(35, N = 714) = 34.69, *p* = .48) and *regulation strategy control* (χ^2(35, N = 1046) = 40.33, *p* = .25) (See Table 27). Furthermore, the relation of support sources and regulation activities could be further analyzed by the adjusted residuals. The following paragraph will present these residuals (See Appendix 2).

Table 27

Chi-Square Tests for the Relations of Regulation Activities and Support Sources

Categories	df	N	χ^2	p
Goal orientation and Support Sources	35	1763	54.59	.02*
Strategic planning and Support Sources	49	1778	232.58	.00**
Monitoring of the learning process and Support Sources	49	1665	193.266	.00**
Self-evaluation of regulation experiences and Support Sources	42	1864	70.49	.00**
Self-reflection of regulation outcomes and Support Sources	42	1934	129.54	.00**
Inferences of subsequent learning experience and Support Sources	49	1845	138.41	.00**
Self-efficacy and Support Sources	35	714	34.69	.48
Regulation strategy control and Support Sources	35	1046	40.33	.25

Note.*Association is significant on the p = .05 level; ** Association is significant on the p = .01 level.

Firstly, when their *goal orientation* was stimulation from others (OF = 20, EF = 11.8, AR = 2.6), or they wanted to practice (OF = 18, EF = 10, AR = 2.7), they used more material than expected. When their goal orientation was unintentional, they had less material than expected (OF = 36, EF = 49.6, AR = -2.7).

Secondly, in *strategic planning*, when they learned by getting information, they received more support from general educator (OF = 83, EF = 64.9, AR = 2.8), peer (OF = 90, EF = 70.8, AR = 2.9) and subject educator than expected (OF = 90, EF = 44.8, AR = 8.2), but less support from colleagues (OF = 41, EF = 59.9, AR = -3), family or friends (OF = 5, EF = 19.9, AR = -3.9), mentor (OF = 27, EF = 73.7, AR = -6.8) or pupil than expected (OF = 16, EF = 44.3, AR = -5.1). When they learned by doing or experiencing, they received more support from family or friends (OF = 34, EF = 22.8, AR = 2.8), but less support from subject educator than expected (OF = 34, EF = 51.3, AR = -3).

Thirdly, in *monitoring of the learning process*, when they received new information, they used more material (OF = 52, EF = 23.3, AR = 6.9) and got more support from subject educator (OF = 72, EF = 39.4, AR = 6.2), but less support from family or friends (OF = 7, EF = 18.4, AR = -3.1), mentor (OF = 27, EF = 62.7, AR = -5.6) or pupil than expected (OF = 16, 38.5, AR = -4.3). When they saw or heard other's

reaction in monitoring the learning process, they had more support from colleagues (OF = 34, EF =21.1, AR = 3.2) and pupil (OF = 27, EF = 15.6, AR = 3.2), but less support from general educator (OF = 11, EF = 22.8, AR = -2.8).

Fourthly, in *self-reflection on the learning outcomes*, when pre-service teachers reflected their learning or identity as a teacher, they had more support from family or friends (OF = 39, EF = 24.8, AR = 3.4) and general educator (OF = 95, EF = 75.8, AR = 2.8). When they reflected on a rule of thumb, they had more support from mentor (OF = 72, EF = 51.9, AR = 3.3), but used less material than expected (OF = 7, EF = 18.7, AR = -3). When they reflected factual knowledge, they had less support from mentor (OF = 58, EF = 76.4, AR = -2.6). When they reflected on procedural knowledge, they used more material (OF = 20, EF = 8.3, AR = 4.4).

Fifthly, in *self-evaluation of learning experiences*, when they hoped others to behave better, they had more support from family or friends (OF = 5. EF = 1.1, AR = 3.7). When they totally satisfied and skipped the evaluation, they had more support from subject educator (OF = 191, EF = 169, AR = 4), but less support from family or friends (OF = 64, EF = 77, AR = -3.3).

Sixthly, in *inferences of subsequent learning experience*, when they planned to apply in practice what they had learned, they used more material (OF = 51, EF = 35.3, AR = 3.2), and got more support from peer (OF = 118, EF = 97.7, AR = 2.7), subject educator (OF = 98, EF = 62.4, AR = 5.7), but less support from family or friends (OF = 14, EF = 26.7, AR = -3) and mentor (OF = 60, EF = 99.5, AR = -5.2). When they planned to consolidate what they have learned, they had more support from mentor (OF = 44, EF = 30.7, AR = 2.8).

All adjusted residuals of *self-efficacy* and *regulation strategy control* lied inside ±2.58 (See tables in the Appendix 1).

6.5.3 The Relations between Support Types and Regulation Activities

Chi-square analyses showed that associations between support types and most regulation activities were significant on the p = .05 level, excluding *self-efficacy* (χ^2(20, N = 714) = 29.73, *p* = .07) (See Table 28). Furthermore, the relation of support sources and regulation activities could be further analyzed by the adjusted residuals (See Appendix 1). The following eight paragraphs will present these adjusted residuals.

Table 28

Chi-Square Tests for the Relation of Regulation Activities and Support Types

Categories	df	N	χ^2	p
Goal orientation*Support Types	20	1763	104.43	.00**
Strategic planning*Support Types	28	1778	594.26	.00**

Regulation strategy control*Support Types	20	1046	32.03	.04*
Monitoring of the learning process*Support Types	28	1665	462.99	.00**
Self-evaluation of regulation experiences*Support Types	24	1864	111.12	.00**
Self-reflection of regulation outcomes*Support Types	24	1934	214.56	.00**
Inferences of subsequent learning experience*Support Types	28	1845	164.19	.00**
Self-efficacy*Support Types	20	714	29.73	.07

Note.* Association is significant on the p = .05 level; ** Association is significant on the p = .01 level

Firstly, when they had unintentional *goal orientation*, they had more emotional support (OF = 90, EF = 71.2, AR = 3.1). When they were unsatisfied with a previous experience, they had more indirect feedback, but less support in terms of collaboration (OF = 8, EF = 23.9, AR = -3.7). When others stimulated them to develop, they received more information (82, EF = 59.8, AR = 3.7). When they wanted to practice, they had more support in terms of information (OF = 8, EF = 51.1, AR = 5.5), but less support in terms of direct feedback (OF = 44, EF = 61.5, AR = -3) and indirect feedback (OF = 8, EF = 17.9, AR = -2.6).

Secondly, when they did not think about their *self-efficacy*, they had more information (OF = 40, EF = 28.7, AR = 2.8) but less emotional support (OF = 0, EF = 6, AR = -2.7).

Thirdly, when they did not know their strategy, they had more emotional support (OF = 4, EF =.8, AR = 3.7). When they learned by doing or experiencing, they had more collaboration (OF = 56, EF = 37.1, AR = 3.8) but less information (OF = 105, EF = 152.7, AR = -5.5). When they learned by evaluating what went well and wrong in their lessons, they had more direct feedback (OF = 87, EF = 65.4, AR = 3.6) but less information (OF = 36, EF = 54.7, AR = -3.2). When they analyzed self and other's roles in a situation, they had more indirect feedback (OF = 31, EF = 18.6, AR = 3.2), emotional support (OF = 31, EF = 14, AR = 5.0), but less information (OF = 34, EF = 56.3, AR = -3.8). When they learned by getting information, they had more information (OF = 295, EF = 133.2, AR = 19.5) but less direct feedback (OF = 4.8, EF = 159.4, AR = -12.9), indirect feedback (OF = 12, EF = 44.1, AR = -5.8), and emotional support (OF = 5, EF = 33, AR = -5.8). When they learned from other's feedback, they had more direct feedback (OF = 215, EF = 119.7, AR = 12.3) but less information (OF = 32, EF = 100, AR = -9.1) and collaboration (OF = 8, EF = 24.3, AR = 3.8). When they learned by observing how others do things, they had more indirect feedback (OF = 19, EF = 7.1, AR = 4.8) but less direct feedback (OF = 10, EF = 25.8, AR = -4.1).

Fourthly, in *monitoring of the learning process*, when their strategy did not work out well, they had more emotional support (OF = 15, EF = 7.3, AR = 3.0) but less information (OF = 10, EF = 26.8, AR = -4.1). When they saw or heard other's reaction, they had more indirect feedback (OF = 26, EF = 16.1, AR = 2.8) but less information (OF = 32, EF = 47.3, AR = -2.8). When they got feedback from others, they had more direct feedback (170, EF = 91.6, AR = 11.3) but less indirect feedback (OF = 15, EF = 26.7, AR = -2.6), information (OF = 32, EF = 78.7, AR = -6.9), and

emotional support (OF = 9, EF = 21.6, AR = -3.1). When they reflected on their experience, they had more emotional support (OF = 45, EF = 23.6, AR = 5.0). When they were aware of their behavior, they had more indirect feedback (OF = 32, EF = 21.2, V2.6) but less information (OF = 40, EF = 62.5, AR = -3.7).

Fifthly, in *regulation strategy control*, when there was only one way to learn, they had more collaboration (OF = 22, EF = 13.3, AR = 2.7). When they made unconscious choice in *regulation strategy control*, they had more information (OF = 195, EF = 173.9, AR = 2.7).

Sixthly, in *reflection of the learning outcomes*, when they reflected a rule of thumb, they had more direct feedback (OF = 154, EF = 111.6, AR = 5.6), but less information (OF = 74, EF = 94.7, AR = -2.8) and collaboration (OF = 8, EF = 24.7, AR = -3.8). When they reflected on factual knowledge, they had more information (OF = 205, EF = 139.7, AR = 7.6) but less direct feedback (OF = 124, EF = 164.5, AR = -4.6) and emotional support (OF = 19, EF = 38.1, AR = -3.7). When they reflected on procedural knowledge, they had more information (OF = 72, EF = 42, AR = 5.9) but less direct feedback (OF = 26, EF = 49.4, AR = -4.4). When they reflected on their own learning or identity as a teacher, they had more direct feedback (OF = 213, EF = 185, AR = 3) and emotional support (OF = 70, EF = 42.8, AR = 5), but less information (106, EF = 157, AR = -5.7). When they reflected on theory of practice, they had more indirect feedback (OF = 47, EF = 30.2, AR = 3.5). When they only had description of experience but no description of learning, they had more collaboration (OF = 20, EF = 8.6, AR = 4.2).

Seventhly, in *self-evaluation of the learning experience*, when they wanted to learn earlier in their development, they had more indirect feedback (OF = 30, EF = 19.5, AR = 2.7). When they wanted to tackle things differently during this experience, they had more direct feedback (OF = 44, EF = 30.8, AR = 3.1) and emotional support (OF = 14, EF = 7.3, AR = 2.7), but less information (9, 26.5, AR = -4.2). When they wanted students to behave differently, they had more direct feedback (OF = 21, EF = 12.7, AR = 3.0) but less information (OF = 0, EF = 10.9, AR = -4.1). When they wanted others to cooperate better, they had more emotional support (OF = 8, EF = 2, AR = 4.5). When they totally satisfied and skipped evaluation, they had more information (OF = 531, EF = 489.6, AR = 5.0) but less indirect feedback (OF = 148, EF = 163.5, AR = -2.8) or emotional support (OF = 108, EF = 134.1, AR = -5.2).

Eighthly, when they had no new plans in *inference of subsequent learning*, they received more information (OF = 61, EF = 44.5, AR = 3.1) but less indirect feedback (OF = 5, EF = 14.7, AR = -2.8). When their strategy did not work out well and they wanted to try again, they had less information (OF = 5, EF = 12.5, AR = -2.6). When they wanted improve further what they have learned, they had more indirect feedback (OF = 84, EF = 64.5, AR = 3.1) but less information (OF = 161, EF = 195.1, AR = -3.6). When they wanted to apply in practice what they have learned, they had more information (OF = 257, EF = 180.6, AR = 8.3) but less direct feedback (OF = 162, EF = 214.2, AR = -5.4) and emotional support (OF = 26, EF = 46.3, AR = -3.7). When

they wanted to try out what they have learned in a different situation, they had more collaboration (OF = 20, EF = 9.5, AR = 3.7) but less information (OF = 19, EF = 36.2, AR = -3.6). When they had a new learning goal for themselves, they had more emotional support (OF = 26, EF = 12.8, AR = 4.0) but less information (OF = 30, EF = 49.8, AR = -3.6).

6.6 Conclusion

6.6.1 What Support Amount and SDL Quality did Pre-service Teachers Get?

In general, most of pre-service teachers did not receive a very large amount of support in their regulation process. They received different amounts of support from 8 sources. Pre-service teachers received much support from mentors and peers. They also received different amounts of support from 5 types. Pre-service teachers received much support in terms of direct feedback and information.

6.6.2 What are the Relationships between Support Sources and Support Types?

There was a significant association between support sources and support types. Their family and friends offered much emotional support for them. Pre-service teachers used a lot of materials. Their peers collaborated a lot with them, but did not provide support in terms of information. Their mentors gave much direct feedback, but did not give much indirect feedback or information to them. Pupils provided much support to pre-service teachers in terms of indirect feedback. General educators gave them much support in terms of information but little indirect feedback or collaboration with them. Subject educators provided much support in terms of information but little feedback (either direct or indirect) to them.

6.6.3 How does Other's Support Vary through the Program?

Firstly, pre-service teachers received a larger amount of support in the beginning of the program. After that, support amount decreased and then it did not change much. Secondly, there is no significant association between support sources and development process. However, we did find that pre-service teachers received more support from general educators than expected in the end of their dual-program. We also have found out that general educators gave pre-service teachers more support in terms of information. So we know now that general educators gave them more support in terms of information in the end of their dual-program. Thirdly, there is no significant association between support types and development process. In conclusion, pre-service teachers received more support in the beginning of the development process. The development of the program is not

related with support sources or support types.

6.6.4 What are the Relationships between Other's Support and the Quality of Pre-service Teachers' SDL?

Scores in SDL quality (both *passiveness of regulation* and *retrospectiveness of regulation*) were significantly different when pre-service teachers received different support amounts. Their regulation was quite active when they did not receive support from others. When there was some support, pre-service teachers' regulation became more passive. When there was a very large amount of support, their regulation became very active. Pre-service teachers were more retrospectiveness when they received a moderate amount of support, than when they did not receive support from others at all. Their regulation was very perspective when they received a very large amount of support.

Pre-service teachers had different scores in *passiveness of regulation* when they received support from different sources. Their regulations were more passive when they received support from subject educators, than when they received support from family or friends. They had no significantly different scores in *retrospectiveness of regulation* when they received support from different sources. Both dimensions of SDL quality changed significantly when they received different types of support. Their regulations were more passive when they received support in terms of information, than when they received emotional support. Their regulations were more retrospective when they received emotional support, than when they had received support in terms of collaboration with others.

6.6.5 What are the Relationships between Other's Support and different Regulation Activities?

Most regulation activities were significantly correlated with the amount of support pre-service teachers received, except *self-efficacy*. In *goal orientation*, pre-service teachers received a larger amount of support when they were curious about something, rather than when they were unsatisfied with a previous regulation experience. In *strategic planning*, pre-service teachers received a larger amount of support when they received feedback from others, rather than when they were experimenting something. In *monitoring of the learning process*, pre-service teachers received more support amount when they received feedback from others than when they experienced that their strategy did not work out well. In *regulation strategy control*, pre-service teachers received a larger amount of support when they had suggestion from others for choosing strategies, rather than when they chose the easiest or fast way to learn. In *self-reflection on the learning outcome*, pre-service teachers received a larger amount of support when they reflected on the procedural knowledge, rather than when they had no description of learning at all. In *inferences for subsequent learning experiences*, pre-service

teachers received a larger amount of support when they wanted to apply new knowledge, rather than when they wanted to consolidate learning results. In *self-evaluation of the learning experiences*, pre-service teachers received a larger amount of support when they wanted to prepare themselves, rather than when they wanted others to cooperate better.

Support sources are associated with most regulation activities, except *self-efficacy* and *regulation strategy control*. Firstly, in *goal-orientation*, they used more material when others stimulated them to learn. Secondly, they received more information from mentors, general educators, and subject educators for their *strategic planning*. They got more support from peers, family or friends when they were learning by experiencing. Thirdly, in *monitoring of the learning process*, they saw or heard more reaction from colleagues and pupils, and got more information from mentors and material. Fourthly, in *self-reflection of the learning outcomes,* they got more support from mentors when they reflected a rule of thumb, used more material when they reflected on procedural knowledge, and they received more support from family or friends when they were reflecting their own learning or identity as a teacher. Fifthly, in *self-evaluation of the learning experiences,* they got more support from family or friends when they hoped others to behave better. Sixthly, in *inferences for subsequent learning experiences*, they used more material when they wanted to apply in practice what they have learned, had more support from peers, subject educators or general educators when they were planning to apply learning results in practice.

Support types have significant association with most regulation activities, except *self-efficacy* and *regulation strategy control*. Firstly, in *goal orientation*, they had more indirect feedback when they were unsatisfied with previous learning experience. They received more information when others stimulated them to develop. Secondly, in *strategic planning*, they had more collaboration when they were learning by experiencing, or when there was no other way, and had more indirect feedback when they were observing others or analyzing self and other's roles. They also had more emotional support when they were analyzing self and others' roles. Thirdly, in *monitoring of the regulation process*, they received more indirect feedback when they became aware of their own behavior. Fourthly, in *self-reflection*, they had more information when they reflected factual or procedural knowledge. They received direct feedback when reflecting on their identity or a rule of thumb. They had more emotional support when they reflected on their experience and their own learning. Fifthly, in *self-evaluation*, they received more direct feedback when they were evaluating what went well and wrong in their lessons. They had more emotional support when tackled things differently or wanted others to cooperate better. They received more direct feedback when they tackled things differently or wanted students to behave differently. They had more indirect feedback when they thought they shall have leant earlier. Sixthly, in *inferences for subsequent learning experiences*, they received more emotional support when they had new learning goals, had more collaboration when they tried

out learning results, and received more information when they wanted to apply learning results in practice.

Through the analysis of relationships between other's support and regulation activities, we found *self-efficacy* and *regulation strategy control* had no significant association with other's support (*support amount, support sources,* and *support types*).

7 Discussion

SDL is important for both employees and organizations. Internal factors, jobs, colleagues, supervisors, working environments can all influence employees' regulation. Researchers have shown that social learning usually has different levels. Similarly, SDL at the workplace also has different levels. This study has reviewed results from previous researches and finds four levels of SDL for employees at the workplace: task-oriented SDL, interest-oriented SDL, job-oriented SDL, and career-oriented SDL.

This study shows that these four levels of SDL encourage employees set clear and concrete regulation goals or standards in order to enhance their motivation, especially job-oriented SDL and career-oriented SDL's emphasize in learning needs and goals. This is consistent with the goal-setting theory that specific goals and fulfilled needs would activate more personal commitment from employees to their regulation process (Hoy & Miskel, 2008).

These four levels of SDL embrace theories of both the learning paradigm and the performance paradigm from the field of human resource development (HRD). Task-oriented and interested-oriented SDL have relatively more emphasis in employees' performance goals, which are often decided by organizations' human capital and development needs according to the performance paradigm (Mankin, 2009). Job-oriented SDL and career-oriented SDL have more priority in employees' learning goals and personal development, which are often reflected as employee development and working life's fulfillment in the learning paradigm (Swanson & Holton, 2001). There has been a long history of debate about which view of learning is better. This study is not proposing there is a hierarchical order among these four levels. Instead, we can regard them as four different perspectives to understand the concept of SDL at the workplace.

This study shows that employees can have different focuses for their regulation: task accomplishment, interest discoveries, job competence, and employability. There are various regulation activities: task analysis, task sequencing, goal setting, coaching, self-regulation, self-controlling, monitoring, observing, learning needs adjustment, environment reconstruction, resource management, social interaction, information inquiry, collaboration, networking, career planning, performance evaluation, problem diagnosis and attribution, feedback inquiry, process evaluation, and reflection on personal changes. It is quite important for HRD practitioners to have such an overview of various regulation focuses and activities because this

overview could help us to provide a better facilitation for employees who have diverse regulation needs. If their regulation needs are facilitated better, they will have better regulation experiences. This is also consistent with needs theory (DeSimone & Harris, 1998).

Literature findings could also be connected to theories of organizational interventions. This might have several useful implications for HRD practitioners. Task-oriented SDL and interest-oriented SDL have more emphasize in employees' performance, which might benefit from human resource management interventions. Common practices include goal-setting, performance appraisal, reward systems (Cummings & Worley, 2008). Job-oriented SDL has much coaching or mentoring between employees and supervisors (or coaches). Interpersonal interventions shall be helpful for their relationships such as process consultation and team building (Cummings & Worley). Employees also try to manage their career development with SDL. Correspondently, HRD practitioners could initiate interventions for workforce diversity, employee stress and wellness (Cummings & Worley).

We know SDL is not just individual learning, especially in job-oriented SDL and career-oriented SDL. This has been proved by many other researches. However, there is not so much literature review finding about the role of others in SDL. The empirical research tried to answer this question with a sample of pre-service teachers. We found that the amount of support they received did not change a lot during the dual program, although pre-service teachers did received a little bit larger amount of support in the beginning of their program. This is not consistent with the general expectation from the literature that less support was needed in the later period of SDL process (Unger et al., 2009). However, this may indirectly support another opinion from the literature. Others should also be more involved in the reflection phase (Baskett, 1993).

This study shows that pre-service teachers received most support from mentors and peers among 8 *support sources*. Among 5 *support types*, pre-service teachers received much support in terms of direct feedback and information. Pre-service teachers received much emotional support from their family or friends as expected. Pre-service teachers got much support in terms of information from general educator, subject educators, and material. They had much collaboration from peers. They received much direct feedback from their mentors, and indirect feedback from pupils.

Furthermore, this study has found significant associations between other's support and SDL quality (*passiveness of regulation,* and *retrospectiveness of regulation*). Firstly, this study shows that *support types* and *support sources* are related to the quality of pre-service teachers' SDL. Pre-service teachers had more passive regulation when they received support from subject educators. Their regulation was more passive when they received support in terms of information, and more retrospective when they had emotional support. Secondly, this study also shows some important findings about how the quality of their SDL is related to the

amounts of support they received.

There are two possible interpretations from the analysis of the relations between *passiveness of regulation* and *support amounts.* Firstly, others' support made their regulation become active. However, we know that others did not have control over pre-service teachers' SDL and themselves shall be self-responsible for their regulation (Confessore & Kops, 1998). So the first interpretation seems invalid. Secondly, it could be that pre-service teachers' regulation became more active and they also tried to find more support from others. This could be understood as an active help-seeking behavior, which has also been identified as one SDL activity (Greene & Azevedo, 2007). Because they were actively regulating, they tended to consciously and purposefully seek more support from others (Ertmer & Newby, 1996). Also, when their regulation was perspective, they received a large amount of support from others. This is consistent with the literature that participants usually involve others in the planning of their regulation (Pintrich, 1999). We know that in the planning, participants could analyze tasks, set their goals and performance standards, and diagnose potential problems or difficulties (Jossberger et al., 2010). If participants know they need support for some problems, they will be more conscious and active to search where and whom they could get more help late on in their regulation process.

Checking both *passiveness of regulation* and *retrospectiveness of regulation*, we found that when the amount of support from others was low, pre-service teachers had passive retrospective regulations. When the amount of support from others was high, they had active perspective regulations. These two regulation experiences have been described by another research. "Active perspective regulation, whereby the student teacher actively searches for and plans learning experiences; passive retrospective regulation, whereby the learning experiences are not planned by the student teacher and during and after the learning experience no or only a very superficial method of regulation can be seen" (Endedijk, 2010, p.45). Apparently, their regulation was better with a large amount of support from others. This is not consistent with another study's expectation, that helping seeking and support of others may turn self-directed learners into passive learners (Brown, 2001). Both personal commitment and other people's support are important for the regulation process. It is recommended that pre-service teachers shall still involve others into their SDL process in the future.

Analyzing the relations between regulation activities and other's support, we found pre-service teachers' *self-efficacy* was not related to *support amount, support sources, or support types* they received from others. Also, pre-service teachers' *regulation strategy control* did not relate to *support sources* and *support types*. We know *self-efficacy* is about how they themselves believe their own abilities to regulate and provide a desired performance (Schunk, 2005). *Regulation strategy control* refers to participants' internal process of analyzing and monitoring their strategies in order to have a successful performance (Ertmer & Newby, 1996) . Previous researches indicated that higher levels of *self-efficacy* had better

self-guidance, more motivation for participants' regulation processes (Manz & Manz, 1991; Schunk). *Regulation strategy control* shall help employees to understand their regulation results and to discover deeper meanings or principles (Loyens et al., 2008). Both *self-efficacy* and *regulation strategy control* are related to participants' self thinking. We can understand that these two regulation activities are also very important to SDL process; however, how pre-service teachers think about themselves does not necessarily lead to support from external environments back to them.

For pre-service teachers in the future, they could have more collaboration with colleagues, not just with peers. Pre-service teacher could try to ask feedback from pupils in a more direct way, and this might make it easier for pupils to give direct feedback, not just indirect feedback as we found. They shall be aware that other's support does not necessarily effectively help to improve their SDL quality. They themselves shall take responsibility and control over their SDL. Pre-service teacher shall involve other not only in the beginning but also during their SDL process. Also, it seems that pre-service teachers could use a large amount of helpful information from general educators especially in the end of their dual program.

This research has several limitations. We focus on analyzing purposeful regulation activities. This might lead to the limitation of neglecting unintentional regulation experiences and unconsciously proposing all regulation experience shall include planning. Secondly, this paper holds a process-perspective and categorizes different regulation activities into three phases (orientation, performance, and reflection). However, some regulation activities do not necessarily belong to only one phase (e.g. reflective activities could happen during both the performance phase and the reflection phase in the career-oriented SDL). This may unintentionally have given an impression that there is a routine process in SDL.

This study provides a theoretical overview about four different levels of SDL at the workplace. Firstly, based on these findings, future interventions may create a check list of regulation activities and this may help employees make a good planning for their SDL. Secondly, it is also worthwhile for future researches to verify in practice and check whether employees recognize different levels of SDL in themselves. Thirdly, it is recommended to find out how these four levels of SDL relate to each other and how do they influence each other. Furthermore, this study does not try to find a causal influence of support amount on SDL quality; thus, future research may look for a model and try to find out how support amount together with other variables can explain the quality of SDL.

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9 Appendix 1

Table 1

Crosstab of Support Sources with Goal Orientation

Categories		skip, unintentional	unsatisfied	curious	other's stimulation	prepare future	practice	Total
Colleagues	OF	117	46	32	23	17	26	261
	EF	115.5	42.8	29.0	27.4	22.9	23.4	261.0
	AR	.2	.6	.6	-1.0	-1.4	.6	
Family Friend	OF	46	16	10	6	6	6	90
	EF	39.8	14.8	10.0	9.4	7.9	8.1	90.0
	AR	1.3	.4	.0	-1.2	-.7	-.8	
General Educator	OF	124	45	22	31	26	30	278
	EF	123.0	45.6	30.9	29.2	24.4	24.9	278.0
	AR	.1	-.1	-1.9	.4	.4	1.2	
Material	OF	36	11	14	20	13	18	112
	EF	49.6	18.4	12.5	11.8	9.8	10.0	112.0
	AR	-2.7*	-1.9	.5	2.6*	1.1	2.7*	
Mentor	OF	150	62	39	23	29	19	322
	EF	142.5	52.8	35.8	33.8	28.3	28.9	322.0
	AR	.9	1.5	.6	-2.2	.2	-2.1	
Peer	OF	130	49	38	40	24	31	312
	EF	138.0	51.1	34.7	32.7	27.4	28.0	312.0
	AR	-1.0	-.4	.7	1.5	-.8	.7	
Pupil	OF	89	38	19	17	22	9	194
	EF	85.8	31.8	21.6	20.4	17.1	17.4	194.0
	AR	.5	1.3	-.6	-.8	1.3	-2.2	
Subject Educator	OF	88	22	22	25	18	19	194
	EF	85.8	31.8	21.6	20.4	17.1	17.4	194.0
	AR	.3	-2.0	.1	1.2	.3	.4	
Total	OF	780	289	196	185	155	158	1763
	EF	780.0	289.0	196.0	185.0	155.0	158.0	1763.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 2

Crosstab of Support Sources with Self-efficacy

Categories		Confident	well prepared	learned in this way	learned in this context	otherwise	skip,did not think	Total
Colleagues	OF	33	9	4	1	43	8	98
	EF	27.7	7.8	4.4	.8	45.8	11.4	98.0
	AR	1.3	.5	-.2	.2	-.6	-1.2	
Family or friend	OF	10	2	2	0	19	0	33
	EF	9.3	2.6	1.5	.3	15.4	3.8	33.0
	AR	.3	-.4	.4	-.5	1.3	-2.1	
General Educator	OF	23	7	7	1	45	16	99
	EF	28.0	7.9	4.4	.8	46.3	11.5	99.0
	AR	-1.2	-.4	1.3	.2	-.3	1.5	
Material	OF	20	4	3	0	22	13	62
	EF	17.5	4.9	2.8	.5	29.0	7.2	62.0
	AR	.7	-.5	.1	-.8	-1.9	2.4	
Mentor	OF	36	11	4	0	74	9	134
	EF	37.9	10.7	6.0	1.1	62.7	15.6	134.0
	AR	-.4	.1	-.9	-1.2	2.2	-2.0	
Peer	OF	30	10	6	2	61	19	128
	EF	36.2	10.2	5.7	1.1	59.9	14.9	128.0
	AR	-1.3	-.1	.1	1.0	.2	1.3	
Pupil	OF	21	5	4	1	38	7	76
	EF	21.5	6.1	3.4	.6	35.6	8.8	76.0
	AR	-.1	-.5	.3	.5	.6	-.7	
Subject Educator	OF	29	9	2	1	32	11	84
	EF	23.8	6.7	3.8	.7	39.3	9.8	84.0
	AR	1.4	1.0	-1.0	.4	-1.7	.4	
Total	OF	202	57	32	6	334	83	714
	EF	202.0	57.0	32.0	6.0	334.0	83.0	714.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 3

Crosstab of Support Sources with Strategic Planning

Categori	don't	experienc	experimen	evaluat	analyz	informatio	feedbac	observ	Total

es		kno w	e	t	e	e	n	k	e	
Colleagu es	OF	0	80	31	27	27	41	44	15	265
	EF	1.5	68.7	30.3	24.6	25.3	59.9	45.0	9.7	265.0
	AR	-1.3	1.7	.2	.6	.4	-3.0*	-.2	1.9	
Family Friend	OF	1	34	11	8	13	5	15	1	88
	EF	.5	22.8	10.0	8.2	8.4	19.9	14.9	3.2	88.0
	AR	.7	2.8*	.3	-.1	1.7	-3.9**	.0	-1.3	
General Educator	OF	1	61	28	24	23	83	58	9	287
	EF	1.6	74.4	32.8	26.6	27.4	64.9	48.7	10.5	287.0
	AR	-.5	-2.0	-1.0	-.6	-1.0	2.8*	1.6	-.5	
Material	OF	1	20	9	7	6	50	9	3	105
	EF	.6	27.2	12.0	9.7	10.0	23.7	17.8	3.8	105.0
	AR	.6	-1.7	-.9	-1.0	-1.4	6.3	-2.4	-.4	
Mentor	OF	3	100	44	43	31	27	69	9	326
	EF	1.8	84.5	37.2	30.3	31.2	73.7	55.4	11.9	326.0
	AR	1.0	2.2	1.3	2.7*	.0	-6.8**	2.2	-1.0	
Peer	OF	3	78	32	19	30	90	44	17	313
	EF	1.8	81.2	35.7	29.0	29.9	70.8	53.2	11.4	313.0
	AR	1.0	-.4	-.7	-2.2	.0	2.9*	-1.5	1.8	
Pupil	OF	1	54	25	25	29	16	39	7	196
	EF	1.1	50.8	22.4	18.2	18.7	44.3	33.3	7.2	196.0
	AR	-.1	.5	.6	1.8	2.6*	-5.1**	1.2	-.1	
Subject Educator	OF	0	34	23	12	11	90	24	4	198
	EF	1.1	51.3	22.6	18.4	18.9	44.8	33.6	7.2	198.0
	AR	-1.1	-3.0*	.1	-1.7	-2.0	8.2**	-1.9	-1.3	
Total	OF	10	461	203	165	170	402	302	65	1778
	EF	10.0	461.0	203.0	165.0	170.0	402.0	302.0	65.0	1778.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 4

Crosstab of Support Sources with Monitoring of the Learning Process

Categories	don't know	work out	didn't work out	other's reaction	feedback	reflection	new information	behavior	Total

Colleagues	OF	5	54	12	34	38	38	40	23	244
	EF	4.4	53.1	11.9	21.1	35.1	38.3	52.2	27.9	244.0
	AR	.3	.2	.0	3.2*	.6	-.1	-2.1	-1.1	
Family or friend	OF	1	18	8	12	7	17	7	16	86
	EF	1.6	18.7	4.2	7.4	12.4	13.5	18.4	9.8	86.0
	AR	-.5	-.2	1.9	1.8	-1.7	1.1	-3.1*	2.2	
General Educator	OF	3	50	13	11	42	50	65	30	264
	EF	4.8	57.4	12.9	22.8	38.0	41.5	56.5	30.1	264.0
	AR	-.9	-1.2	.0	-2.8*	.8	1.6	1.4	.0	
Material	OF	1	15	1	5	10	15	52	10	109
	EF	2.0	23.7	5.3	9.4	15.7	17.1	23.3	12.4	109.0
	AR	-.7	-2.1	-2.0	-1.6	-1.6	-.6	6.9**	-.8	
Mentor	OF	7	82	21	27	53	42	27	34	293
	EF	5.3	63.7	14.3	25.3	42.1	46.0	62.7	33.5	293.0
	AR	.8	2.9*	2.0	.4	2.0	-.7	-5.6**	.1	
Peer	OF	8	61	13	16	43	43	75	36	295
	EF	5.3	64.2	14.4	25.5	42.4	46.3	63.1	33.7	295.0
	AR	1.3	-.5	-.4	-2.2	.1	-.6	1.9	.5	
Pupil	OF	2	46	10	27	26	28	16	25	180
	EF	3.3	39.2	8.8	15.6	25.9	28.3	38.5	20.6	180.0
	AR	-.7	1.3	.4	3.2*	.0	-.1	-4.3**	1.1	
Subject Educator	OF	3	34	3	11	19	27	72	15	184
	EF	3.3	40.0	9.0	15.9	26.5	28.9	39.4	21.0	184.0
	AR	-.2	-1.1	-2.2	-1.4	-1.7	-.4	6.2**	-1.5	
Total	OF	30	360	81	143	238	260	354	189	1655
	EF	30.0	360.0	81.0	143.0	238.0	260.0	354.0	189.0	1655.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 5

Crosstab of Support Sources with Regulation Strategy Control

Categories		don't know	no other way	suggestion	this way easiest way	often works well	skip, unconscious choice	Total
Colleagues	OF	5	31	17	15	15	73	156
	EF	6.0	23.9	22.4	15.2	13.4	75.2	156.0
	AR	-.4	1.7	-1.3	-.1	.5	-.4	
Family or friend	OF	2	9	5	5	8	17	46

	EF	1.8	7.0	6.6	4.5	4.0	22.2	46.0
	AR	.2	.8	-.7	.3	2.2	-1.6	
General Educator	OF	5	23	21	14	12	90	165
	EF	6.3	25.2	23.7	16.1	14.2	79.5	165.0
	AR	-.6	-.5	-.6	-.6	-.7	1.8	
Material	OF	3	5	15	13	7	36	79
	EF	3.0	12.1	11.3	7.7	6.8	38.1	79.0
	AR	.0	-2.3	1.2	2.1	.1	-.5	
Mentor	OF	7	37	24	16	14	77	175
	EF	6.7	26.8	25.1	17.1	15.1	84.3	175.0
	AR	.1	2.4	-.3	-.3	-.3	-1.2	
Peer	OF	6	24	27	18	13	104	192
	EF	7.3	29.4	27.5	18.7	16.5	92.5	192.0
	AR	-.6	-1.2	-.1	-.2	-1.0	1.8	
Pupil	OF	5	19	21	12	12	43	112
	EF	4.3	17.1	16.1	10.9	9.6	54.0	112.0
	AR	.4	.5	1.4	.4	.8	-2.2	
Subject Educator	OF	7	12	20	9	9	64	121
	EF	4.6	18.5	17.4	11.8	10.4	58.3	121.0
	AR	1.2	-1.7	.7	-.9	-.5	1.1	
Total		40	160	150	102	90	504	1046
		40.0	160.0	150.0	102.0	90.0	504.0	1046.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 6

Crosstab of Support Sources with Self-reflection on the Learning Outcomes

Categories		rule thumb	factual knowledge	procedural knowledge	own learning or identity	teaching practice	theory of practice	no description of learning	Total
Colleagues	OF	43	52	19	66	35	47	22	284
	EF	42.4	62.6	18.8	70.3	35.1	39.9	14.8	284.0
	AR	.1	-1.6	.1	-.6	.0	1.3	2.1	
Family or friend	OF	13	13	3	39	13	17	2	100
	EF	14.9	22.0	6.6	24.8	12.4	14.1	5.2	100.0
	AR	-.6	-2.2	-1.5	3.4**	.2	.9	-1.5	
General Educator	OF	47	67	15	95	31	43	8	306

	EF	45.7	67.4	20.3	75.8	37.8	43.0	16.0	306.0
	AR	.2	-.1	-1.3	2.8*	-1.3	.0	-2.2	
Material	OF	7	36	20	25	21	12	4	125
	EF	18.7	27.5	8.3	31.0	15.4	17.6	6.5	125.0
	AR	-3.0*	1.9	4.4**	-1.3	1.6	-1.5	-1.1	
Mentor	OF	72	58	14	78	45	58	22	347
	EF	51.9	76.4	23.0	85.9	42.9	48.8	18.1	347.0
	AR	3.3**	-2.6*	-2.1	-1.1	.4	1.6	1.0	
Peer	OF	49	90	28	78	40	39	20	344
	EF	51.4	75.8	22.8	85.2	42.5	48.4	18.0	344.0
	AR	-.4	2.0	1.3	-1.0	-.5	-1.6	.5	
Pupil	OF	31	38	6	59	29	37	12	212
	EF	31.7	46.7	14.0	52.5	26.2	29.8	11.1	212.0
	AR	-.1	-1.5	-2.4	1.1	.6	1.5	.3	
Subject Educator	OF	27	72	23	39	25	19	11	216
	EF	32.3	47.6	14.3	53.5	26.7	30.4	11.3	216.0
	AR	-1.1	4.3**	2.5	-2.4	-.4	-2.4	-.1	
Total	OF	289	426	128	479	239	272	101	1934
	EF	289.0	426.0	128.0	479.0	239.0	272.0	101.0	1934.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 7

Crosstab of Support Sources with Self-evaluation of Learning Experiences

Categories		learn earlier	prepare myself	tackle things differently	learn in different way	want student to behave differently	other cooperate better	skip, totally satisfied	Total
Colleagues	OF	24	7	13	2	6	5	215	272
	EF	25.7	9.5	11.7	1.3	4.8	3.2	215.8	272.0
	AR	-.4	-.9	.4	.6	.6	1.1	-.1	
Family or friend	OF	12	4	7	1	4	5	64	97
	EF	9.2	3.4	4.2	.5	1.7	1.1	77.0	97.0
	AR	1.0	.4	1.5	.8	1.8	3.7**	-3.3**	
General Educator	OF	29	7	14	1	4	1	239	295
	EF	27.9	10.3	12.7	1.4	5.2	3.5	234.1	295.0
	AR	.2	-1.1	.4	-.4	-.6	-1.5	.8	
Material	OF	11	7	1	0	0	0	104	123
	EF	11.6	4.3	5.3	.6	2.2	1.5	97.6	123.0

	AR	-.2	1.4	-2.0	-.8	-1.5	-1.3	1.5	
Mentor	OF	38	14	16	1	11	5	248	333
	EF	31.4	11.6	14.3	1.6	5.9	3.9	264.2	333.0
	AR	1.4	.8	.5	-.5	2.3	.6	-2.4	
Peer	OF	25	11	13	2	4	4	269	328
	EF	31.0	11.4	14.1	1.6	5.8	3.9	260.3	328.0
	AR	-1.2	-.1	-.3	.4	-.8	.1	1.3	
Pupil	OF	25	10	13	1	4	1	149	203
	EF	19.2	7.1	8.7	1.0	3.6	2.4	161.1	203.0
	AR	1.5	1.2	1.6	.0	.2	-1.0	-2.2	
Subject Educator	OF	12	5	3	1	0	1	191	213
	EF	20.1	7.4	9.1	1.0	3.8	2.5	169.0	213.0
	AR	-2.0	-1.0	-2.2	.0	-2.1	-1.0	4.0**	
Total	OF	176	65	80	9	33	22	1479	1864
	EF	176.0	65.0	80.0	9.0	33.0	22.0	1479.0	1864.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 8

Crosstab of Support Sources with Inferences for Subsequent Learning Experiences

Categories		no plan	try again	action plan	consolidate	improve further	apply	try in different situation	new goals	
Colleagues	OF	22	4	17	31	89	68	17	19	267
	EF	19.5	5.5	14.8	24.5	85.7	79.3	15.9	21.9	267.0
	AR	.6	-.7	.6	1.5	.5	-1.6	.3	-.7	
Family or friend	OF	1	4	5	11	37	14	6	12	90
	EF	6.6	1.9	5.0	8.2	28.9	26.7	5.4	7.4	90.0
	AR	-2.3	1.6	.0	1.0	1.9	-3.0*	.3	1.8	
General Educator	OF	23	7	15	26	87	95	14	28	295
	EF	21.6	6.1	16.3	27.0	94.7	87.6	17.6	24.1	295.0
	AR	.3	.4	-.4	-.2	-1.0	1.0	-1.0	.9	
Material	OF	12	1	4	6	34	51	4	7	119
	EF	8.7	2.5	6.6	10.9	38.2	35.3	7.1	9.7	119.0
	AR	1.2	-1.0	-1.1	-1.6	-.8	3.2*	-1.2	-.9	
Mentor	OF	19	8	28	44	122	60	22	32	335
	EF	24.5	6.9	18.5	30.7	107.5	99.5	20.0	27.4	335.0
	AR	-1.3	.5	2.5	2.8*	1.9	-5.2**	.5	1.0	
Peer	OF	31	9	15	21	94	118	21	20	329

	EF	24.1	6.8	18.2	30.1	105.6	97.7	19.6	26.9	329.0
	AR	1.6	1.0	-.8	-1.9	-1.5	2.7*	.4	-1.5	
Pupil	OF	7	3	13	16	77	44	18	22	200
	EF	14.6	4.1	11.1	18.3	64.2	59.4	11.9	16.4	200.0
	AR	-2.2	-.6	.6	-.6	2.1	-2.5	1.9	1.5	
Subject	OF	20	2	5	14	52	98	8	11	210
Educator										
	EF	15.4	4.3	11.6	19.2	67.4	62.4	12.5	17.2	210.0
	AR	1.3	-1.2	-2.1	-1.3	-2.4	5.7**	-1.4	-1.7	
Total	OF	135	38	102	169	592	548	110	151	1845
	EF	135.0	38.0	102.0	169.0	592.0	548.0	110.0	151.0	1845.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 9

Crosstab of Support Types with Goal Orientation

Categories		direct feedback	indirect feedback	information	emotional support	collaboration	Total
skip,unintentional	OF	303	85	233	90	69	780
	EF	303.5	88.5	252.2	71.2	64.6	780.0
	AR	.0	-.5	-2.0	3.1*	.8	
Unsatisfied	OF	131	48	76	26	8	289
	EF	112.5	32.8	93.4	26.4	23.9	289.0
	AR	2.4	3.1*	-2.4	-.1	-3.7**	
Curious	OF	90	17	56	13	20	196
	EF	76.3	22.2	63.4	17.9	16.2	196.0
	AR	2.1	-1.3	-1.2	-1.3	1.0	
other's stimulation	OF	56	14	82	9	24	185
	EF	72.0	21.0	59.8	16.9	15.3	185.0
	AR	-2.5	-1.7	3.7**	-2.1	2.4	
prepare future	OF	62	28	41	16	8	155
	EF	60.3	17.6	50.1	14.2	12.8	155.0
	AR	.3	2.8*	-1.6	.5	-1.5	
Practice	OF	44	8	82	7	17	158
	EF	61.5	17.9	51.1	14.4	13.1	158.0
	AR	-3.0*	-2.6*	5.5**	-2.2	1.2	
Total	OF	686	200	570	161	146	1763
	EF	686.0	200.0	570.0	161.0	146.0	1763.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 10

Crosstab of Support Types with Self-efficacy

Categories		direct feedback	indirect feedback	information	emotional support	collaboration	Total
Confident	OF	69	22	77	15	19	202
	EF	78.6	20.9	69.9	14.7	17.8	202.0
	AR	-1.6	.3	1.2	.1	.3	
well prepared	OF	26	5	17	3	6	57
	EF	22.2	5.9	19.7	4.2	5.0	57.0
	AR	1.1	-.4	-.8	-.6	.5	
learned sth in this way	OF	9	3	11	4	5	32
	EF	12.5	3.3	11.1	2.3	2.8	32.0
	AR	-1.3	-.2	.0	1.2	1.4	
learned something in this context	OF	3	0	2	0	1	6
	EF	2.3	.6	2.1	.4	.5	6.0
	AR	.6	-.8	-.1	-.7	.7	
Otherwise	OF	146	36	100	30	22	334
	EF	130.0	34.6	115.5	24.3	29.5	334.0
	AR	2.5	.3	-2.5	1.6	-2.0	
skip,did not think	OF	25	8	40	0	10	83
	EF	32.3	8.6	28.7	6.0	7.3	83.0
	AR	-1.8	-.2	2.8*	-2.7*	1.1	
Total	OF	278	74	247	52	63	714
	EF	278.0	74.0	247.0	52.0	63.0	714.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 11

Crosstab of Support Types with Strategic Planning

Categories		direct feedback	indirect feedback	information	emotional support	collaboration	Total
don't know	OF	3	1	1	4	1	10
	EF	4.0	1.1	3.3	.8	.8	10.0
	AR	-.6	-.1	-1.6	3.7**	.2	
Experience	OF	193	59	105	48	56	461
	EF	182.8	50.6	152.7	37.9	37.1	461.0
	AR	1.1	1.5	-5.5**	2.0	3.8**	
Experiment	OF	88	23	61	19	12	203
	EF	80.5	22.3	67.2	16.7	16.3	203.0
	AR	1.1	.2	-1.0	.6	-1.2	
Evaluate	OF	87	21	36	16	5	165
	EF	65.4	18.1	54.7	13.5	13.3	165.0

	AR	3.6**	.8	-3.2*	.7	-2.5	
Analyze	OF	61	31	34	31	13	170
	EF	67.4	18.6	56.3	14.0	13.7	170.0
	AR	-1.1	3.2*	-3.8**	5.0**	-.2	
Information	OF	48	12	295	5	42	402
	EF	159.4	44.1	133.2	33.0	32.3	402.0
	AR	-12.9**	-5.8**	19.5**	-5.8**	2.0	
Feedback	OF	215	29	32	18	8	302
	EF	119.7	33.1	100.0	24.8	24.3	302.0
	AR	12.3**	-.8	-9.1**	-1.6	-3.8**	
Observe	OF	10	19	25	5	6	65
	EF	25.8	7.1	21.5	5.3	5.2	65.0
	AR	-4.1**	4.8**	.9	-.2	.4	
Total	OF	705	195	589	146	143	1778
	EF	705.0	195.0	589.0	146.0	143.0	1778.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 12

Crosstab of Support Types with Monitoring of Learning Process

Categories		direct feedback	indirect feedback	information	emotional support	collaboration	Total
don't know	OF	13	1	9	2	5	30
	EF	11.5	3.4	9.9	2.7	2.4	30.0
	AR	.6	-1.4	-.4	-.5	1.7	
work out	OF	151	49	106	28	26	360
	EF	138.6	40.5	119.0	32.6	29.4	360.0
	AR	1.5	1.6	-1.6	-1.0	-.7	
didn't work out	OF	40	13	10	15	3	81
	EF	31.2	9.1	26.8	7.3	6.6	81.0
	AR	2.1	1.4	-4.1**	3.0*	-1.5	
other's reaction	OF	54	26	32	21	10	143
	EF	55.0	16.1	47.3	13.0	11.7	143.0
	AR	-.2	2.8*	-2.8*	2.4	-.5	
Feedback	OF	170	15	32	9	12	238
	EF	91.6	26.7	78.7	21.6	19.4	238.0
	AR	11.3**	-2.6*	-6.9**	-3.1*	-1.9	
Reflection	OF	92	34	68	45	21	260
	EF	100.1	29.2	85.9	23.6	21.2	260.0
	AR	-1.1	1.0	-2.6	5.0**	-.1	
new information	OF	40	16	250	6	42	354
	EF	136.3	39.8	117.0	32.1	28.9	354.0

	AR	-11.9**	-4.5**	16.9**	-5.4**	2.9*	
Behavior	OF	77	32	40	24	16	189
	EF	72.7	21.2	62.5	17.1	15.4	189.0
	AR	.7	2.6*	-3.7**	1.8	.2	
Total	OF	637	186	547	150	135	1655
	EF	637.0	186.0	547.0	150.0	135.0	1655.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 13

Crosstab of Support Types with Regulation Strategy Control

Categories		direct feedback	indirect feedback	information	emotional support	collaboration	Total
don't know	OF	21	3	10	2	4	40
	EF	15.4	4.5	13.8	2.9	3.3	40.0
	AR	1.8	-.8	-1.3	-.6	.4	
no other way	OF	65	20	42	11	22	160
	EF	61.8	18.0	55.2	11.6	13.3	160.0
	AR	.6	.5	-2.4	-.2	2.7*	
Suggestion	OF	69	18	50	7	6	150
	EF	57.9	16.9	51.8	10.9	12.5	150.0
	AR	2.0	.3	-.3	-1.3	-2.1	
easiest way	OF	43	11	34	5	9	102
	EF	39.4	11.5	35.2	7.4	8.5	102.0
	AR	.8	-.2	-.3	-1.0	.2	
this way often works well	OF	30	12	30	12	6	90
	EF	34.8	10.2	31.1	6.5	7.5	90.0
	AR	-1.1	.6	-.2	2.3	-.6	
skip, unconscious choice	OF	176	54	195	39	40	504
	EF	194.7	56.9	173.9	36.6	41.9	504.0
	AR	-2.4	-.6	2.7*	.6	-.4	
Total	OF	404	118	361	76	87	1046
	EF	404.0	118.0	361.0	76.0	87.0	1046.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 14

Crosstab of Support Types with Self-reflection

Categories		direct feedback	indirect feedback	information	emotional support	collaboration	Total
rule thumb	OF	154	29	74	24	8	289

	EF	111.6	32.1	94.7	25.9	24.7	289.0
	AR	5.6**	-.6	-2.8*	-.4	-3.8**	
factual knowledge	OF	124	36	205	19	42	426
	EF	164.5	47.4	139.7	38.1	36.3	426.0
	AR	-4.6**	-2.0	7.6**	-3.7**	1.1	
procedural knowledge	OF	26	6	72	5	19	128
	EF	49.4	14.2	42.0	11.4	10.9	128.0
	AR	-4.4**	-2.4	5.9**	-2.1	2.6	
own learning or identity	OF	213	58	106	70	32	479
	EF	185.0	53.2	157.0	42.8	40.9	479.0
	AR	3.0*	.8	-5.7**	5.0**	-1.7	
teaching practice	OF	80	32	76	28	23	239
	EF	92.3	26.6	78.3	21.4	20.4	239.0
	AR	-1.7	1.2	-.3	1.6	.6	
theory of practice	OF	108	47	71	25	21	272
	EF	105.1	30.2	89.2	24.3	23.2	272.0
	AR	.4	3.5**	-2.5	.2	-.5	
no description of learning	OF	42	7	30	2	20	101
	EF	39.0	11.2	33.1	9.0	8.6	101.0
	AR	.6	-1.4	-.7	-2.5	4.2**	
Total	OF	747	215	634	173	165	1934
	EF	747.0	215.0	634.0	173.0	165.0	1934.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 15

Crosstab of Support Types with Self-evaluation of Learning Experiences

Categories		direct feedback	indirect feedback	information	emotional support	collaboration	Total
learn earlier	OF	61	30	56	23	6	176
	EF	67.8	19.5	58.3	16.0	14.5	176.0
	AR	-1.1	2.7*	-.4	1.9	-2.5	
prepare myself	OF	27	7	18	7	6	65
	EF	25.0	7.2	21.5	5.9	5.4	65.0
	AR	.5	-.1	-.9	.5	.3	
tackle things differently	OF	44	12	9	14	1	80
	EF	30.8	8.8	26.5	7.3	6.6	80.0

	AR	3.1*	1.2	-4.2**	2.7*	-2.3	
learn in different way	OF	3	1	1	3	1	9
	EF	3.5	1.0	3.0	.8	.7	9.0
	AR	-.3	.0	-1.4	2.5	.3	
want student to behave differently	OF	21	6	0	6	0	33
	EF	12.7	3.6	10.9	3.0	2.7	33.0
	AR	3.0*	1.3	-4.1**	1.8	-1.7	
other cooperate better	OF	7	2	2	8	3	22
	EF	8.5	2.4	7.3	2.0	1.8	22.0
	AR	-.6	-.3	-2.4	4.5**	.9	
skip, totally satisfied	OF	555	148	531	108	137	1479
	EF	569.7	163.5	489.6	134.1	122.2	1479.0
	AR	-1.7	-2.8*	5.0**	-5.2**	3.1	
Total	OF	718	206	617	169	154	1864
	EF	718.0	206.0	617.0	169.0	154.0	1864.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

Table 16

Crosstab of Support Types with Inferences for Subsequent Learning Experiences

Categories		Direct feedback	Indirect feedback	Information	Emotional support	Collaboration	Total
no plan	OF	43	5	61	9	17	135
	EF	52.8	14.7	44.5	11.4	11.6	135.0
	AR	-1.8	-2.8*	3.1*	-.8	1.7	
try again	OF	21	2	5	6	4	38
	EF	14.8	4.1	12.5	3.2	3.3	38.0
	AR	2.1	-1.1	-2.6*	1.6	.4	
action plan	OF	47	11	24	14	6	102
	EF	39.9	11.1	33.6	8.6	8.8	102.0
	AR	1.5	.0	-2.1	2.0	-1.0	
consolidate	OF	78	18	51	14	8	169
	EF	66.0	18.4	55.7	14.3	14.6	169.0
	AR	2.0	-.1	-.8	-.1	-1.9	
improve further	OF	251	84	161	55	41	592
	EF	231.3	64.5	195.1	50.1	51.0	592.0

	AR	2.0	3.1*	-3.6**	.9	-1.8	
apply	OF	162	48	257	26	55	548
	EF	214.2	59.7	180.6	46.3	47.2	548.0
	AR	-5.4**	-1.9	8.3**	-3.7**	1.4	
try in different situation	OF	49	16	19	6	20	110
	EF	43.0	12.0	36.2	9.3	9.5	110.0
	AR	1.2	1.3	-3.6**	-1.2	3.7**	
new goals	OF	70	17	30	26	8	151
	EF	59.0	16.5	49.8	12.8	13.0	151.0
	AR	1.9	.1	-3.6**	4.0**	-1.5	
Total	OF	721	201	608	156	159	1845
	EF	721.0	201.0	608.0	156.0	159.0	1845.0

Note.* Deviation of the Observed frequency from the Expected frequency is significant on the p = .05 level; **Deviation of the Observed frequency from the Expected frequency is significant on the p = .01 level; OF = Observed Frequency, EF = Expected Frequency, AR = Adjusted Residuals

10 Appendix 2

Table 1

Multiple Comparisons of SDL Quality in different Support Amounts

Dependent Variable	(I) Support Amount	(J) Support Amount	Mean Difference (I-J)	Std. Error	p	95% Confidence Interval	
						Lower Bound	Upper Bound
		1.00	-0.64*	0.08	0.00	-0.90	-0.39
		2.00	-0.69*	0.09	0.00	-0.98	-0.41
		3.00	-0.47*	0.12	0.00	-0.85	-0.10
		4.00	0.19	0.17	1.00	-0.37	0.75
		5.00	0.19	0.23	1.00	-0.54	0.91
		6.00	0.25	0.23	1.00	-0.48	0.98
		7.00	0.11	0.31	1.00	-0.87	1.09
	0.00	8.00	0.13	0.28	1.00	-0.76	1.03
		0.00	0.64*	0.08	0.00	0.39	0.90
		2.00	-0.05	0.09	1.00	-0.35	0.24
		3.00	0.17	0.12	1.00	-0.21	0.55
		4.00	0.84*	0.18	0.00	0.27	1.40
		5.00	0.83*	0.23	0.01	0.10	1.56
		6.00	0.89*	0.23	0.00	0.16	1.63
		7.00	0.75	0.31	0.51	-0.23	1.74
	1.00	8.00	0.78	0.28	0.19	-0.12	1.67
		0.00	0.69*	0.09	0.00	0.41	0.98
		1.00	0.05	0.09	1.00	-0.24	0.35
		3.00	0.22	0.13	1.00	-0.18	0.62
		4.00	0.89*	0.18	0.00	0.31	1.47
		5.00	0.88*	0.23	0.01	0.14	1.62
		6.00	0.94*	0.23	0.00	0.20	1.69
		7.00	0.80	0.31	0.34	-0.19	1.79
	2.00	8.00	0.83	0.28	0.12	-0.07	1.73
		0.00	0.47*	0.12	0.00	0.10	0.85
		1.00	-0.17	0.12	1.00	-0.55	0.21
		2.00	-0.22	0.13	1.00	-0.62	0.18
		4.00	0.67*	0.20	0.02	0.04	1.29
		5.00	0.66	0.24	0.25	-0.12	1.44
		6.00	0.72	0.24	0.11	-0.06	1.51
		7.00	0.58	0.32	1.00	-0.44	1.60
	3.00	8.00	0.61	0.29	1.00	-0.33	1.55
Passiveness of		0.00	-0.19	0.17	1.00	-0.75	0.37
Regulation	4.00	1.00	-0.84*	0.18	0.00	-1.40	-0.27

		2.00	-0.89*	0.18	0.00	-1.47	-0.31
		3.00	-0.67*	0.20	0.02	-1.29	-0.04
		5.00	-0.01	0.28	1.00	-0.89	0.88
		6.00	0.06	0.28	1.00	-0.83	0.94
		7.00	-0.08	0.34	1.00	-1.19	1.02
		8.00	-0.06	0.32	1.00	-1.08	0.97
		0.00	-0.19	0.23	1.00	-0.91	0.54
		1.00	-0.82*	0.23	0.01	-1.56	-0.10
		2.00	-0.88*	0.23	0.01	-1.62	-0.14
		3.00	-0.66	0.24	0.25	-1.44	0.12
		4.00	0.01	0.28	1.00	-0.88	0.89
		6.00	0.06	0.31	1.00	-0.94	1.06
		7.00	-0.08	0.37	1.00	-1.27	1.12
	5.00	8.00	-0.05	0.35	1.00	-1.18	1.07
		0.00	-0.25	0.23	1.00	-0.98	0.48
		1.00	-.089*	0.23	0.00	-1.63	-0.16
		2.00	-0.94*	0.23	0.00	-1.69	-0.20
		3.00	-0.72	0.24	0.11	-1.51	0.06
		4.00	-0.06	0.28	1.00	-0.94	0.83
		5.00	-0.06	0.31	1.00	-1.06	0.94
		7.00	-0.14	0.37	1.00	-1.34	1.06
	6.00	8.00	-0.11	0.35	1.00	-1.24	1.01
		0.00	-0.11	0.31	1.00	-1.09	0.87
		1.00	-0.75	0.31	0.51	-1.74	0.23
		2.00	-0.80	0.31	0.34	-1.79	0.19
		3.00	-0.58	0.32	1.00	-1.60	0.44
		4.00	0.08	0.34	1.00	-1.02	1.19
		5.00	0.08	0.37	1.00	-1.12	1.27
		6.00	0.14	0.37	1.00	-1.06	1.34
	7.00	8.00	0.03	0.41	1.00	-1.28	1.33
		0.00	-0.13	0.28	1.00	-1.03	0.76
		1.00	-0.78	0.28	0.19	-1.67	0.12
		2.00	-0.83	0.28	0.12	-1.73	0.07
		3.00	-0.61	0.29	1.00	-1.55	0.33
		4.00	0.06	0.32	1.00	-0.97	1.08
		5.00	0.05	0.35	1.00	-1.07	1.18
		6.00	0.11	0.35	1.00	-1.01	1.24
	8.00	7.00	-0.03	0.41	1.00	-1.33	1.28
		1.00	-0.32*	0.09	0.01	-0.60	-0.05
		2.00	-0.21	0.10	1.00	-0.51	0.10
		3.00	-0.22	0.13	1.00	-0.62	0.18
Retrospectiveness		4.00	-0.15	0.19	1.00	-0.75	0.44
of Regulation	0.00	5.00	-0.13	0.24	1.00	-0.91	0.65

		6.00	-0.46	0.24	1.00	-1.24	0.31
		7.00	0.02	0.33	1.00	-1.02	1.07
		8.00	0.43	0.30	1.00	-0.52	1.38
		0.00	0.32*	0.09	0.01	0.05	0.60
		2.00	0.12	0.10	1.00	-0.20	0.43
		3.00	0.11	0.13	1.00	-0.30	0.51
		4.00	0.17	0.19	1.00	-0.43	0.77
		5.00	0.20	0.24	1.00	-0.59	0.98
		6.00	-0.14	0.24	1.00	-0.92	0.64
		7.00	0.35	0.33	1.00	-0.70	1.40
	1.00	8.00	0.76	0.30	0.41	-0.20	1.71
		0.00	0.21	0.10	1.00	-0.10	0.51
		1.00	-0.12	0.10	1.00	-0.43	0.20
		3.00	-0.01	0.13	1.00	-0.44	0.42
		4.00	0.05	0.19	1.00	-0.56	0.67
		5.00	0.08	0.25	1.00	-0.71	0.87
		6.00	-0.26	0.25	1.00	-1.05	0.54
		7.00	0.23	0.33	1.00	-0.82	1.29
	2.00	8.00	0.64	0.30	1.00	-0.32	1.61
		0.00	0.22	0.13	1.00	-0.18	0.62
		1.00	-0.11	0.13	1.00	-0.51	0.30
		2.00	0.01	0.13	1.00	-0.42	0.44
		4.00	0.06	0.21	1.00	-0.61	0.73
		5.00	0.09	0.26	1.00	-0.75	0.92
		6.00	-0.25	0.26	1.00	-1.08	0.59
		7.00	0.24	0.34	1.00	-0.85	1.33
	3.00	8.00	0.65	0.31	1.00	-0.35	1.65
		0.00	0.15	0.19	1.00	-0.44	0.75
		1.00	-0.17	0.19	1.00	-0.77	0.43
		2.00	-0.05	0.19	1.00	-0.67	0.56
		3.00	-0.06	0.21	1.00	-0.73	0.61
		5.00	0.02	0.29	1.00	-0.92	0.97
		6.00	-0.31	0.29	1.00	-1.26	0.63
		7.00	0.18	0.37	1.00	-1.00	1.35
	4.00	8.00	0.59	0.34	1.00	-0.51	1.68
		0.00	0.13	0.24	1.00	-0.65	0.91
		1.00	-0.20	0.24	1.00	-0.98	0.59
		2.00	-0.08	0.25	1.00	-0.87	0.71
		3.00	-0.09	0.26	1.00	-0.92	0.75
	5.00	4.00	-0.02	0.29	1.00	-0.97	0.92

	6.00	-0.34	0.33	1.00	-1.40	0.73
	7.00	0.15	0.40	1.00	-1.12	1.43
	8.00	0.56	0.37	1.00	-0.64	1.76
	0.00	0.46	0.24	1.00	-0.31	1.24
	1.00	0.14	0.24	1.00	-0.64	0.92
	2.00	0.26	0.25	1.00	-0.54	1.05
	3.00	0.25	0.26	1.00	-0.59	1.08
	4.00	0.31	0.29	1.00	-0.63	1.26
	5.00	0.34	0.33	1.00	-0.73	1.40
	7.00	0.49	0.40	1.00	-0.79	1.77
6.00	8.00	0.90	0.37	0.61	-0.30	2.10
	0.00	-0.02	0.33	1.00	-1.07	1.02
	1.00	-0.35	0.33	1.00	-1.40	0.70
	2.00	-0.23	0.33	1.00	-1.29	0.82
	3.00	-0.24	0.34	1.00	-1.33	0.85
	4.00	-0.18	0.37	1.00	-1.35	1.00
	5.00	-0.15	0.40	1.00	-1.43	1.12
	6.00	-0.49	0.40	1.00	-1.77	0.79
7.00	8.00	0.41	0.43	1.00	-0.98	1.80
	0.00	-0.43	0.30	1.00	-1.38	0.52
	1.00	-0.76	0.30	0.41	-1.71	0.20
	2.00	-0.64	0.30	1.00	-1.61	0.32
	3.00	-0.65	0.31	1.00	-1.65	0.35
	4.00	-0.59	0.34	1.00	-1.68	0.51
	5.00	-0.56	0.37	1.00	-1.76	0.64
	6.00	-0.90	0.37	0.61	-2.10	0.30
8.00	7.00	-0.41	0.43	1.00	-1.80	0.98

*. The mean difference is significant at the 0.05 level.

11 Appendix 3

The Learning Report

This questionnaire was formulated and used in a dissertation work (Endedijk, 2010).

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

Multiple choice options

A Reflection on learning content in terms of a rule of thumb.

B Reflection on learning content in terms of factual knowledge.

C Reflection on learning content in terms of procedural knowledge.

D Reflection on learning content in terms of own learning or identity as a teacher.

E Reflection on learning content in terms of a specific teaching practice.

F Reflection on learning content in terms of theory of practice.

G No reflection in terms of learning, only description of an experience.

2a. Did you plan to learn this?

Multiple choice options

A No, I did not plan to learn this (proceed with question

B Not specifically for this moment, but I had an intention to learn this.

C Yes

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

Multiple choice options

A I was unsatisfied about a previous experience.

B I was curious about something.

C Others stimulated me to develop myself in this.

D I wanted to prepare myself for future possible experiences.

E I wanted to practice with something.

F Otherwise, namely…

(skipped, because of an unplanned learning experience)

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

A … I don't know actually.

B … doing it or experiencing it.

C … experimenting something.

D … evaluating what went well and wrong in my lesson or another situation.

E … analyzing my and others' role in a situation.

F … getting information.

G … getting feedback from others.

H … observing how others do something.

I Otherwise, namely…

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

A No, this was no conscious choice (proceed with question

B Yes, I thought about that beforehand.

(skipped, because of an unplanned learning experience)

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

Multiple choice options

A I don't know.

B It is not possible to learn it in another way.

C Someone else suggested to me to learn it this way.

D This was the easiest or the fastest way to learn it.

E Compared with other ways of learning, this way of learning often works well for me.

F Otherwise, namely …

(skipped, because it was no conscious choice)

(skipped, because of an unplanned learning experience)

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

A Yes

B No

C I didn't know, but I hoped to succeed (proceed with question

D I didn't think about that beforehand (proceed with question

(skipped, because of an unplanned or unintentional learning experience)

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

A I was (not) confident in myself to succeed.

B I was well prepared.

C The last time I learned something in this WAY, it also worked out well/did not work out well.

D The last time I learned something in this CONTEXT, it also worked out well/did not work out well.

E Otherwise, namely…

(skipped, because did not think about it)

(skipped, because of an unplanned or unintentional learning experience)

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

Multiple choice options

A I don't know.

B The moment I experienced that it worked out well.

C The moment I experienced that it did NOT work out well.

D The moment I saw or heard the reaction of others.

E The moment I received feedback.

F The moment I reflected on my experience.

G The moment I realized that I received new information.

H The moment I became aware of my own behavior.

I Otherwise, namely …

Missing values (due to a mistake in a skip logic)

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

Multiple choice options

A No (proceed with question

B Yes

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

Multiple choice options

A … I would have wanted to learn this earlier in my development.

B … I would have wanted to prepare myself better.

C … I would have wanted to tackle things differently during this experience.

D … I would have liked to learn this in a different way.

E … I would have wanted my students to behave differently.

F … I would have hoped that others would cooperate better.

G Otherwise, namely…

(skipped, because totally satisfied)

8. How do you proceed with this learning experience?

Multiple choice options

A I have no new plans (yet).

B It did not work out the way I wanted, so I am going to try again.

C I have exactly figured out what I will do next time in a comparable situation.

D I want to consolidate what I have learned.

E I want to improve further what I have learned.

F I want to apply in practice what I have learned.

G I want to try out what I have learned in a different situation.

H Based on what I have learned, I have formulated a new learning goal for myself.

I Otherwise, namely…

9a, did you get any support in this learning experience or did you learn it totally by yourself?

A No, all by myself.

B Yes

9b, If yes, by whom did you receive support?

A Colleagues

B Family and friends

C General educator

D Materials

E Mentor

F Peers

G Pupil

H Subject educator

9c,What kind of support did you receive?

A Direct feedback.

B Indirect feedback.

C Information.

D Emotional support.

E Collaboration.