Sustainable Feedback in Higher Education

Relation Between and Changeability of Self-Efficacy, Goal Orientation, and Learning Behavior

The research reported in this thesis was carried out at the Open University of the Netherlands at Welten Institute – Research Centre for Learning, Teaching and Technology

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Voorwoord

Mijn leven was, is en blijft onderwijs. Ik ga al sinds mijn jonge jaren 'naar school', dat is nooit veranderd. Mijn rol in dat onderwijs wel. Van leerling, student, docent, naar leidinggevende en onderzoeker, maar in de praktijk nog steeds een lerende.

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Gerry Geitz
Noord-Sleen, 2015

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Introduction

1.1 BACKGROUND OF THE THESIS

Students in higher education live and study in a rapidly changing world, which not only affects the content of their study and the way they have to study, but also their future working environments and the jobs they are preparing themselves for. Changing regulations in the Netherlands - in terms of higher education funding (i.e., tuition, scholarships, loans), limitations on the length of study time (e.g., penalties for taking too long to get one's degree), and mandatory study cessation in cases of negative study advice due to insufficient credits earned - might affect the learning behavior of students in higher education. In addition, their future employment prospects are also subject to change. Flexible labor contracts, the quick emergence and often somewhat slower disappearance of professions (i.e., economic obsolescence; Thijssen & Walter, 2008), and rapid technological developments place great demands on students' attitudes, skills, and learning behavior, both at present and into the future. The question is, how can educators in higher education contribute to the process of student development directed at gaining knowledge and developing the skills necessary to be successful both in and beyond school?

The changing requirements of today's society place great demands on the design and organization of learning environments. Both knowledge construction and the ability to transfer this constructed knowledge to rapidly evolving real-life contexts have become crucial elements of learning environments in higher education (Alt, 2015). The implementation of whole-task learning environments, such as problem-based learning, can contribute to alleviating the problems caused by these changing demands because they feature the acquisition and construction of knowledge as well as the acquisition of complex cognitive skills through the process of carrying out and/or solving meaningful, real-life tasks and problems (De Kock, Sleegers, & Voeten, 2004; Van Merriënboer & Kirschner, 2013). This process of constructing knowledge and acquiring the ability to transfer knowledge to new, unknown contexts correspondingly requires adjustments to students' learning behavior. The ability to link concepts and think critically are necessary elements of learning behavior in order to be able to transfer acquired knowledge and skills to novel situations and tasks. Such learning behavior is known as *deep learning* (Marton & Säljö, 1979):

> Deep learning involves the critical analysis of new ideas, linking them to already known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts. Deep learning promotes understanding and application for life. (Kester, Kirschner, & Corbalan, 2007, p. 1048).

Besides deep learning, Marton and Säljö (1979) distinguished *surface learning*; "the tacit acceptance of information and memorization as isolated and unlinked facts" (Kester et al., 2007). With the assumption that deep learning is a critical success factor for

students now and in the future, it is important for researchers to investigate and educators to understand how deep learning can be stimulated and developed. In this respect, it is important to note that deep and surface learning are functions of individual student characteristics along with how they perceive the teaching and learning context (Biggs, Kember, & Leung, 2001). Thus, the concepts of deep and surface learning address a student's disposition towards learning, often referred to as their 'approach to learning'. However, in this dissertation, both deep and surface learning are seen as *learning behaviors* to stress the active behavioral aspect of learning, with the nuance that these behaviors are affected by several internal and external factors.

In previous research, learning behaviors have been associated with learners' feelings of self-efficacy and their goal orientations (Bandura, 2012; Phan, 2010). *Self-efficacy* is one's belief as to whether someone is able to execute the required behavior in order to achieve prospective outcomes (Bandura, 1977). This belief is reflected in the motivation, effort, and persistence exhibited during the execution of a task. Generally speaking, highly self-efficacious learners are found to display deep learning behavior (Usher & Pajares, 2008; Van Dinther, Dochy, & Segers, 2011; Zimmerman, 2000).

Students' approach to learning is known as their *goal orientation*. When a student's goal orientation is one of becoming good or better at something, it is considered to be a *mastery* orientation. If the goal orientation is one of obtaining good or at least sufficient grades to pass a course, then it is considered to be a *performance* orientation (Elliot & McGregor, 2001). Positive associations between deep learning and mastery orientation have been found in an extensive body of research (Fennolar, Román, & Cuestas, 2007; Liem, Lau, & Nie, 2008; Phan, 2013). As concluded by Phan (2013), students who are driven by mastering new knowledge and skills are most likely to display deep learning behavior.

According to Phan (2013), it can be assumed that there are relations between self-efficacy, goal orientations, and learning behavior. Knowledge about these assumed relations might inform devising ways to stimulate deep learning in students and educate them such that they are able to deal with the changing demands of their future societal and working environments. In other words, on the assumption that deep learning is a critical success factor for students to be successful now and in the future, the assumed relations between self-efficacy, goal orientations, and learning behavior might offer direction in terms of designing and adjusting learning environments.

As stated, these behaviors are affected by both internal (i.e., elements within the learning environment) and external (i.e., elements outside the learning environment) factors. An appropriate design of the learning environment, including elements such as forms of assessment, perceived study load, and perceived quality of teaching, should stimulate these beliefs and behaviors (Richardson & Remedios, 2014). One of the most relevant and effective element in the learning environment is *feedback* (Carless, 2006; Hattie & Timperley, 2007; Narciss et al., 2014). In general, feedback can be seen as

"information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding" (Hattie & Timperley, 2007, p. 81). The purpose of feedback runs from corrective actions on work already carried out to feedback directed at longitudinal development of students (Price, Handley, Millar, & O'Donnovan, 2010). The last category of feedback contributes to the knowledge construction and transfer thereof to new situations. In other words, longitudinal development feedback helps students cope with the demands of today's requirements in higher education.

Longitudinal development of students means an explicit feed forward goal of feedback. To support this process Karagiannopoulou and Christodoulides (2005) introduced *feedback dialogues* as a way to engage students in deep learning. The dialogic processes and activities which can support and inform students on their current task while also developing the ability to self-regulate their performance on future tasks are defined as *sustainable feedback* (Carless, Salter, Yang, & Lam, 2011). An important aspect of sustainable feedback is that students ask for and seek feedback instead of the feedback being initiated and transmitted by teachers (Boud & Molloy, 2013; Carless, 2013; Nicol & MacFarlane-Dick, 2006). When feedback is only directed at students and is viewed merely as the transmission of information from teachers to students, the interaction of feedback messages with self-efficacy, goal orientations, and learning behavior is not fully acknowledged (Nicol & MacFarlane-Dick, 2006). In other words, feedback should not be seen as a one-way cognitive information process about what is right or wrong and why, but should also be directed at students' beliefs and motivation. Bringing together the assumed relations between self-efficacy, goal orientations, and learning behavior and the challenges educators face nowadays, it is worthwhile to investigate the impact of sustainable feedback on these concepts.

The main research question addressed in this dissertation is as follows:

What are the relations between self-efficacy, goal orientation, and learning behavior and are they changeable; and, if so, what are the effects of a sustainable feedback intervention?

1.2 CONTEXT AND NATURE OF THE STUDIES IN THIS THESIS

The context of the research carried out in this thesis was a *problem-based learning* (PBL) environment in a Bachelor of Business Administration program. PBL is an instructional approach designed to enhance deep learning in which collaborative group work is used (Barrows, 1996; Papinczak, Young, Groves, & Haynes, 2008). Some of the key elements of PBL are the use of ill-structured problems to encourage students to think about the cause of a problem and how to solve it; a student-centered approach where students have to determine what to learn with tutors who facilitate and

stimulate students to ask themselves questions (Barrows, 2010). The studies in this thesis were conducted among first-year Bachelor of Business Administration marketing students in the Netherlands. The academic year at the institution was divided into four periods of eight weeks, and the studies carried out (i.e., validation study and intervention study) were organized in the third period of the first year. The marketing students worked together in PBL groups and their learning environment was composed of both group work and individual work. The scheduled workload was 15 European Credits (ECs; 1 EC = 28.35 study hours), of which 3 ECs involved PBL group work, and 12 ECs (4 courses of 3 ECs each) were in subjects related to the practical problem. The subjects of these four courses were business, commerce, communication, and modern foreign languages. These courses were taught and individually assessed by expert teachers. Both written and oral assessments were performed. The PBL group work was guided by a tutor and consisted of analyzing and solving a marketing problem. The PBL group work was assessed on a group level with the possibility to individually adjust the group mark based on the tutor's evaluation of the student's participation. The four subject-related courses were assessed with a written and/or oral exam and were all graded on an individual level. Overall, the PBL group work, the four courses, and the assessments are a coherent program.

The nature of the studies in this dissertation is validation and intervention. First, the theoretical framework on relations between self-efficacy, goal orientation, and learning behavior was validated using a pre-test/post-test non-equivalent group design with three repeated measures among first-year higher education students. Second, an intervention study was set up to investigate the effect of sustainable feedback on self-efficacy, goal orientation, and learning behavior. An experimental pre-test/post-test non-equivalent group design was carried out. The sustainable feedback intervention was aimed at enhancing self-efficacy and stimulating a mastery orientation and deep learning. The intervention was based on theoretical assumptions of how to influence these three concepts and the features of sustainable feedback. Two conditions were distinguished—a control condition and an experimental condition. In the experimental condition, sustainable feedback was implemented, aimed at "active student participation in dialogic activities in which students generate and use feedback from peers, self or others as part of an ongoing process of developing capacities as autonomous self-regulating learners" (Carless, 2013, p. 113). Tutors were instructed to stimulate and guide students to engage in feedback dialogue. Students were instructed to write down their individual learning points (i.e., what they themselves would like to improve upon in terms of all aspects of their PBL work: from writing skills to chairing a meeting) based on their experience in PBL groups in the first two periods. Learning points were formulated as questions related to aspects of collaboration in PBL groups. During the next session, the members of each group shared their feedback questions with their peers in their PBL group and the tutor. The tutor stimulated and guided the feedback dialogue directed at the students' feedback questions. To help students to

develop skills to become self-regulated learners, they were asked to write down their own judgments (i.e., an evaluation) of their performance on their specific learning points (i.e., their feedback questions). Through this approach, they had to explicitly monitor and judge their own skill-development. At the end of every meeting, the students had to write down the feedback they had sought as well as the feedback messages they had received. Halfway through the eight-week period, students were given the opportunity to formulate one or two new feedback questions. Finally, a qualitative study was set up to explore students' and tutors' perceptions of sustainable feedback.

1.2.1 Method

Self-efficacy, goal orientation, and learning behavior were measured using validated questionnaires. Self-efficacy was measured using the translated STPQ-scale (Van Meeuwen, Brand-Gruwel, Kirschner, De Bock, & Van Merriënboer, 2012); goal orientation was measured using a validated translated version of the Achievement Goals Questionnaire (Elliot & McGregor, 2001), and learning behavior (i.e., deep and surface learning) was measured using a validated translated version of the R-SPQ-2F (Biggs, Kember, & Leung, 2001).

As findings in previous studies showed different and contradictory relations between self-efficacy, goal orientation, and learning behavior, replication studies in a specific Business Administration context are carried out to validate the relations found in previous studies. Some of the previous studies used analyses on a mean-level, for example, Elliot & McGregor (2001), some of them used analyses on an individual level, for example, Fryer and Elliot (2007). In the studies in this thesis, we combined individual-level analyses and mean-level analyses, because only using mean-level analyses might mask significant changes on the individual level as the increases and decreases in the changes of individuals might cancel each other out on the mean-level (Fryer & Elliot, 2007; Zahra & Hedge, 2010).

1.3 OVERVIEW OF THE THESIS

The general aim of the research described in this thesis is to gain knowledge on the relation between self-efficacy, goal orientation, and learning behavior displayed by students in higher education in addition to the changeability of these concepts and the possibility to influence these concepts in the context of a PBL environment. Four overall research questions as well as sub-questions were formulated (see Table 1.1).

Table 1.1. Research questions of the studies

	Main research question	Sub-questions
1 – Validation of theoretical framework	• What is the relationship between self-efficacy, goal orientation, and learning behavior, and in which direction do these concepts change over time?	• Do self-efficacy, goal orientation, and learning behavior change over time, and, if so, in what direction? • What is the relationship between self-efficacy, goal orientation, and learning behavior?
2 – Intervention study part 1	• Does sustainable feedback alter the adopted goal orientation of students into a mastery orientation and therefore also the learning behavior into a deep learning behavior?	• What is the relation between goal orientation and learning behavior? • Do goal orientation and learning behavior indeed change over time, and if so, in what direction? • What are the effects of sustainable feedback from peers and tutors on goal orientation and learning behavior?
3 – Intervention study part 2	• What are the effects of asking for and seeking feedback from peers and tutors on self-efficacy and, learning behavior of first-year marketing students in PBL groups?	• What is the relation between self-efficacy learning behavior, and performance outcomes? o What is the relation between self-efficacy and learning behavior? o Do self-efficacy and learning behavior change over time, and, if so, in what direction? • What are the effects of asking for and seeking feedback from peers and tutors on self-efficacy and learning behavior?
4 – Qualitative study	• How did both students and tutors perceive the use and value of sustainable feedback?	

Chapter 2 provides a theoretical framework on the relation between and changeability of self-efficacy, goal orientation, and learning behavior and shows the results of this relation among first-year students. The theoretical assumed relations and changeability are presented. In the first quantitative study, first-year students reported at three separate points their feelings of self-efficacy, goal orientation, and learning behavior. These measurements were conducted prior to, halfway through, and at the end of an eight-week period.

The sustainable feedback intervention is presented in the following chapters. In Chapter 3 the relation between goal orientation and learning behavior and the influence of feedback on goal orientation and learning behavior are central, and in Chapter 4 the relation between self-efficacy and learning behavior and the influence of feedback on self-efficacy and learning behavior are the focus. In Chapter 3 the relation between and changeability of goal orientation and learning behavior as well as the design and implementation of a sustainable feedback intervention are described. Students in the two conditions (i.e., control and experimental) reported their goal orientation and learning behavior prior to and after the intervention. Relations, changeability, and the effect of the sustainable feedback intervention on goal

orientation and learning behavior are presented. In Chapter 4 the relation between self-efficacy and learning behavior and the changeability of both concepts are presented. The effect of the sustainable feedback intervention on these concepts is presented and discussed. The stability as well as the relations between both concepts were also analyzed, using validated questionnaires at both pre-test and post-test.

In Chapter 5 the perceptions of the tutors and students regarding sustainable feedback are presented. Whereas in Chapters 3 and 4 the results of the intervention study are quantitatively analyzed, in Chapter 5 qualitative information and analyses are added to provide a more complete picture. Both tutors and students are interviewed following a standardized open-ended structure. Based on the theoretical framework of the sustainable feedback intervention, the perceptions of students and tutors are explored.

Finally, in Chapter 6 the main findings, general issues, methodological considerations, and recommendations for future research are given.

2

Changing Learning Behavior: Self-Efficacy and Goal Orientation in PBL Groups in Higher Education

This chapter is based on:
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ABSTRACT

Self-efficacy and goal orientation are important variables which affect student learning behavior. To investigate the relationship between these variables and their effect on learning behavior over time, a pre-test-post-test non-equivalent group design with three repeated measures was used. During an eight-week period, student self-efficacy, goal orientation, and learning behavior were measured using validated questionnaires among first-year higher education, mixed-nationality (Dutch and German) students in a problem-based learning context. Goal orientations were significantly related to deep learning, and self-efficacy was significantly related to a specific goal orientation, namely the mastery-approach. Mastery goal orientations decreased over time, while the surface learning behavior increased. Significant differences were found between nationalities with respect to learning behavior and goal orientation.

2.1 INTRODUCTION

Rapid technological changes and globalization of markets place great demands on the attitudes, skills, and learning behaviors of students in the field of Marketing. To better prepare these marketing students in higher education for their future working environment colleges and universities confront them with various real-life tasks during their studies. In carrying out these tasks, students may encounter difficulties, not necessarily because they lack the knowledge and/or skills to carry out the task but rather because they may lack the personal belief that they are able to execute the behaviors required to achieve the desired outcomes (Bandura, 1997). When students lack knowledge and/or skills, teachers can use their repertoire of teaching techniques helping to fill this gap. However, when students have knowledge and skills but do not believe that they can utilize them to execute the necessary behavior, it is not always clear how their specific mind-set can be influenced to increase their so called self-efficacy (Chan & Lam, 2008).

Moreover, in working on a task, students can approach it or relate to it in different ways. They can invest much or little effort, feel confident or insecure, be convinced that they will or will not master the skills needed, be anxious that they will make mistakes or be overconfident that they can do it easily, think that their intelligence is fixed or changeable, etcetera. This state of mind is called goal orientation and is expressed in terms of which goals can be achieved and how to achieve them. In previous research, both self-efficacy and goal orientation have been found to be associated with students' learning behavior (Bandura, 1997; Bandura & Schunk, 1981; Elliot, 1999, Elliot & McGregor, 2001; Zimmerman, 2000), which can be conceptualized in terms of deep and surface learning behavior. Deep learning behavior is associated with the willingness to understand and engage in meaningful learning and use strategies appropriate for gaining knowledge. A surface approach is directed toward an adequate or superficial way of learning, with motives extrinsic to the real purpose of the task (Vanthournout, Coertjens, Gijbels, Donche, & Van Petegem, 2013). Like self-efficacy, learning behavior affects performance outcomes (Chan & Lam, 2008).

In general, for optimal performance, learners should (1) be given learning tasks aligned with their knowledge and abilities (i.e., neither too simple nor too difficult), (2) feel confident that they can carry out the task (i.e., experience positive self-efficacy) under the condition that they have the necessary knowledge and abilities, and (3) have a goal orientation that guides them to acquire the necessary knowledge and skills.

Prior research has not been clear about whether self-efficacy, goal orientation, and learning behavior should be seen as stable traits that remain constant over time or whether they change / can be changed during the course of carrying out a substantial task (Fan, Meng, Billings, Litchfield, & Kaplan, 2008). In other words, do self-efficacy, goal orientation, and learning behavior change during a teaching period in which students work on meaningful, real-life assignments, such as problem-based marketing

cases? If they can be changed, then this has important implications for educational practice. In the present study, the relationship between self-efficacy, goal orientation, and learning behavior is investigated to determine how they relate to each other and whether they change over time. If they can be affected, then the learning environment has to be organized in a way that stimulates learners to adaptive patterns of cognitive strategy use (i.e., deep learning) and high achievement.

The next sections discuss the concepts of self-efficacy, goal orientation, and learning behavior in more detail and discuss the assumed relations between them.

2.1.2 Self-efficacy and learning behavior

Learning is an ongoing process in which behavior is motivated and regulated by one's cognitions (Stevens & Gist, 1997). One set of cognitions is self-efficacy, defined by Bandura (1977, 1997) as an individual's belief in one's own capabilities to execute behaviors required to achieve prospective outcomes. Self-efficacy is "people's beliefs about their capabilities to exercise control over events that affect their lives" (Bandura, 1989, p. 1175). He maintained that even if individuals believe that outcomes can be influenced by behaviors or responses, they will not attempt to exert control unless they also believe that they themselves are capable of producing the requisite responses or behaviors. The degree to which a person believes that a required behavior can be produced in a certain situation (i.e., self-efficacy) is contextual, for example, the belief that one will learn what needs to be learnt can depend upon the domain that needs to be studied. A person can feel very self-efficacious about learning in one domain but have feelings of low self-efficacy in another. In higher education, students are educated within a specific domain (in this study the domains of business and marketing) which they have chosen as their future working environment. To better prepare them for their future working environment, one approach is to offer / present them with real-life cases within a problem-based learning environment.

A strong sense of self-efficacy has been found to enhance personal accomplishment (Bandura, 1997; Usher & Pajares, 2008; Zimmerman, 2000). In general, people with high self-efficacy approach difficult tasks as challenges, become interested and deeply engrossed in their activities, set challenging goals and maintain a strong commitment to those goals. They have been found to maintain a task-diagnostic focus that guides effective task performance which heightens and sustains their efforts in the face of failure. They attribute eventual failure to insufficient effort on their part, which can be remedied by increasing their effort, or to a lack of knowledge or skills which they feel they can acquire. They quickly recover their sense of self-efficacy after failures or setbacks and approach threatening situations with the assurance that they can exercise control over them. Students who doubt their own capabilities (i.e., have low self-efficacy) show an opposite reaction (Bandura, 1997). While self-efficacy has been found to be contextually determined (e.g., high in math, low in language), it has not been

investigated whether it is a stable trait. Does self-efficacy change over time in a specific context in a negative (i.e., decreasing self-efficacy) or positive (i.e., increasing self-efficacy) direction? Support for seeing self-efficacy as a dynamic trait can be found in Usher and Pajares' research (2008) which distinguished four factors that affect self-efficacy:

- Mastery experience: after completing a task, students interpret and evaluate their results and judge or revise their competence. Successful mastery (i.e., effort leading to the desired outcomes) enhances self-efficacy beliefs.
- Vicarious experience: one's abilities are judged in comparison to the abilities of other students. If a student is as successful as or more successful than other students, then value can be added to the student's own performance.
- Verbal and social persuasion: feelings of self-efficacy can be enhanced by encouragement from parents, teachers, and/or trusted peers though they may be limited in their ability to create sustainable increases in self-efficacy.
- Emotional and physiological state: for students, physiological arousal during activities is an indicator of competence. Bandura (1997) suggested that people function optimally when their physiological arousal is neither too high nor too low.

Of these factors, mastery experience seems to be the most effective factor.

The learning behavior that students display is characterized by Biggs (1987) as either deep or surface learning. Deep learning is characterized by strategies such as elaborating on ideas, thinking critically, and linking/integrating one concept with another while surface learning is characterized by strategies such as memorization and reproduction. Self-efficacy has been associated with both deep and surface learning (Liem, Lau, & Nie, 2008). However, it is important to realize that measuring deep and surface learning behavior has been found to be influenced by both context and task (Biggs, Kember, & Leung, 2001). This means, that it is necessary to study these concepts within specific contexts in higher education if one is to gain knowledge on how these learning behaviors can be stimulated in a way that students can meet the requirements set in the learning environment.

In summary, self-efficacy affects learning behavior in terms of choice of activities and tasks, level of invested effort, and persistence in carrying out a task. The main source of self-efficacy, the mastery experience, has a major influence on a person's sense of self-efficacy in new upcoming situations (Usher & Pajares, 2008). Performance outcomes affect the sense of self-efficacy in a new situation (i.e., in a comparable context). Based on the literature, it is assumed that the relation between self-efficacy, learning behavior, and performance outcomes is an ongoing process. However, it is not clear whether the change in self-efficacy has taken place only after receiving the results of a task or that it is already changing in the teaching period.

2.1.2 Goal orientation and learning behavior

In addition to self-efficacy, goal orientation has also been found to affect learning behavior (Stevens & Gist, 1997). Different approaches can be distinguished in terms of the way people learn. If the goal orientation is aimed at obtaining good grades, then this is seen as performance orientation. When the goal orientation is aimed at becoming good or better at something, then this is seen as mastery orientation. Mastery and performance orientation are defined as functions of competence. The expectation of a learning outcome adds another classification of goal orientation, namely, an approach or avoidance orientation (Bernacki, Byrnes, & Cromley, 2012; Elliot & McGregor, 2001; Van Yperen, Elliot, & Anseel, 2009). When a positive, desirable outcome is expected, the learner will have the desire to achieve success (i.e., an approach orientation will be seen). When a negative, undesirable outcome is expected, the learner will have the desire to avoid failure (i.e., an avoidance orientation will be seen). Four types of goal orientation can thus be distinguished: mastery-avoidance, mastery-approach, performance-avoidance, and performance-approach (Elliot, 1999). DeShon and Gillespie (2005) provided a large overview of the concept goal orientation and the fundamental differences in conceptualizations of goal orientations over time. Their fundamental statement is that the study of goal orientations is an examination of choice behavior in achievement situations. They state that depending on a specific achievement situation a person is able to switch goal orientations over the course of working on a task. To better understand this switching phenomenon, goal orientations need to be studied within specific achievement situations.

Each goal orientation may lead to both positive and negative learning behavior. Mastery oriented students strive for competence development, increase of knowledge, and understanding, therefore it is not surprising that these students are often found to show a deep learning behavior (Fennolar, Román, & Cuastas, 2007). These positive structural paths have been found by Fenollar, Román, and Cuestas (2007) and Liem, Lau, and Nie (2008), namely that mastery goals facilitate a deep learning behavior which leads to higher learning achievement. The relation between mastery orientation and surface learning is not as clear. Students with a mastery orientation might also show a high level of surface learning as part of their learning strategy if the assessment task that they will be given requires them to also to recall specific knowledge. However, this shallower approach of the learning material (i.e., the lack of studying to fully understand the learning material) is contradicting with a mastery orientation. Pintrich (2000) saw goal orientations in a broader sense, suggesting that learners are driven to similar outcomes by multiple goals simultaneously. The adoption of both mastery goals and performance-approach goals can also be beneficial to achieve desired outcomes.

Goal orientation is affected by the expected performance outcomes and not the achieved and evaluated performance outcomes, which is the case for self-efficacy. Although goal orientations might be affected by the expected performance outcomes

during the teaching period, it is not clear from previous research how goal orientations change. A specific goal orientation of a student might change from mastery-avoidance into mastery-approach or from mastery-avoidance in performance-avoidance within a specific achievement situation.

2.1.3 The relationship between self-efficacy and goal orientation

With regard to the relation between self-efficacy and goal orientation, Stevens and Gist (1997) stated that self-efficacy may facilitate the adoption of a certain goal orientation. This is supported by social-cognitive theory (Bandura, 1989); individuals' perceptions of self-efficacy impact many aspects of their lives, including their goals (Caraway, Tucker, Reinke, Reinke, & Hall, 2003). Goal orientation works in conjunction with self-efficacy; as goals are achieved, self-efficacy is enhanced. Liem, Lau, and Nie (2008) reported that self-efficacy was positively predictive of mastery goal adoption, and performance-approach goal adoption, and negatively predictive of performance-avoidance goal adoption. Students who believe that they are capable of doing something and who expect to succeed at that thing will be motivated to approach this success, and are more likely to exert effort engaging with the learning material. More specifically, high self-efficacy beliefs lead to 'approach' orientations (i.e., mastery-approach and performance-approach) while low self-efficacy beliefs lead to ' avoidance' orientations (i.e., mastery-avoidance and performance-avoidance) (Fennolar et al., 2007). These results support what Elliot (1999) also found. In this respect, we hypothesize that self-efficacy will prove to be a predictor of the adoption of a specific goal orientation.

Besides the relation between self-efficacy and goal orientation, both self-efficacy and goal orientation have been found to be context-specific (Jiang, Song, Lee, and Bong, 2014). The learning environment and more specifically the way students perceive this environment have been found to influence feelings of self-efficacy and the adopted goal orientation as well. Jiang, Song, Lee, and Bong (2014) conclude that the perception of the learning environment increases or decreases feelings of self-efficacy. Learning contexts with a focus on student development often enhances feelings of self-efficacy; if competition is stressed, self-efficacy is often weakened The same applies to goal orientations; challenging tasks, cooperation with peers, and informative feedback pursues mastery goals. Performance goals are pursued by uniform tasks, competition with peers, and emotional corrective feedback. This means that if the goal is to enhance feelings of self-efficacy and stimulate mastery orientation the features of the learning environment, such as focus on student development and cooperation between peers, are of importance.

Though both self-efficacy and goal orientation are personal characteristics, research has shown that culture (e.g., nationality, underlying cultural beliefs, values) is also of influence (Liem, Lau, & Nie, 2008). Modern higher education is characterized by an increasing international focus on educating students for a globalized working

environment. Also, the student population at many institutions of higher education has become increasingly diverse, especially in terms of nationality. Differences in nationalities and cultures may lead to different patterns of learning (i.e. learning strategies, conceptions of learning, and learning orientations) (Marambe, Vermunt, & Boshuizen, 2011). Therefore, this study will be executed within an international learning environment in order to contribute specific intercultural insights to the concepts of self-efficacy, goal orientation, and learning behavior. Overall, the learning environment in which this study will be conducted is characterized by meaningful, real-life marketing tasks (i.e., problem-based learning) and students of mixed nationalities. In our study we validate results (i.e., relation between and changeability of self-efficacy, goal orientation, and learning behavior) found in previous research to first-year higher education marketing students in order to investigate whether these results are universal, or that they might differ across domains, learning environments, and nationalities.

2.1.4 Research questions and hypotheses

The overall research question is "What is the relationship between self-efficacy, goal orientation, and learning behavior, and in which direction do these concepts change over time?" The following subsidiary research questions can be distinguished:

RQ1. Do self-efficacy, goal orientation, and learning behavior change over time, and if so, in what direction?

RQ2. What is the relationship between self-efficacy, goal orientation, and learning behavior?

Based on the theoretical framework research question 2 is based on four hypotheses:

H1. Self-efficacy is a predictor of the adoption of a specific goal orientation.

H2. Self-efficacy affects learning behavior.

H3. Goal orientation affects learning behavior.

H4. National background leads to different orientations and learning behavior.

2.2 METHOD

2.2.1 Context

In the third eight-week period of the first year of the Bachelor of Business Administration program on Marketing, students worked together in a problem-based learning (PBL) group to solve marketing problems. The primary features of PBL are:

working on tasks in small groups, thematic interdisciplinary education, substantial emphasis on skills training, and attitude development (Gijselaers, 1995). The student body is international and includes Dutch and German students. PBL groups consisted originally of 12 students, but they were split into two smaller groups during the elaboration of the tasks. In each group, Dutch and German students were mixed. They followed several courses aimed at problem solving. The program is taught in Dutch and all of the German students are proficient in that language.

2.2.2 Participants

Participants were first-year students in marketing. The group consisted of 77 first-year Dutch and German students (N=77; 37 males, 40 females; M_{age}=20.26; SD=1.87; range: 17-26 years, 57 Dutch, 20 Germans).

2.2.3 Design

A pre-test-post-test non-equivalent group design with three repeated measures was used.

2.2.4 Instruments

A questionnaire composed of three sub-questionnaires, all used in previous research among undergraduate students, was used.

- Self-efficacy was measured using the translated STPQ-scale (Van Meeuwen, Brand-Gruwel, Kirschner, De Bock, & Van Merriënboer, 2012); a 20-item, 5-point Likert scale. Cronbach's alpha values were .83 (SE for performance), .73 (SE for learning), .62 (task value).
- Goal orientation was measured using a validated translated version of the Achievement Goals Questionnaire (Elliot & McGregor, 2001), a 12-item measure that assesses learners' orientation. Subscales for each achievement goal were composed of three 7-point Likert items. Cronbach's alpha values were .87 (mastery-approach), .89 (mastery-avoidance), .92 (performance-approach), .83 (performance-avoidance).
- Learning behavior (i.e., deep and surface learning) was measured using a validated translated version of the R-SPQ-2F (Biggs et al., 2001); a 20-item, 5-point Likert scale. Cronbach's alpha values were .73 (deep learning), .64 (surface learning).

2.2.5 Procedure

On the Friday (week 0, time point A) preceding the beginning of the project (week 1), all students were informed about the PBL project and were instructed to discuss and

choose an existing product to adapt for new target groups. They filled in the questionnaires. In weeks 4 (time point B) and 8 (time point C), the instructions focused on the task of the upcoming week. After this, the students again filled in the questionnaires. Time points A, B and C are all during the teaching period, before a final exam in week 9.

2.2.6 Data analysis

Data analysis began with descriptive statistical analyses. Scales were composed on the basis of reliability calculations (Cronbach's alpha). A repeated measures ANOVA was conducted to determine whether there were statistically significant differences in the four types of goal orientations, self-efficacy, and learning behavior over the course of eight weeks. The relation between the variables was analyzed with a correlation analysis and a mixed model analysis (linear regression). Selecting cases (i.e., student groups scoring high on specific variables) was used to be able to make more specific statements about these groups. Independent-samples t-tests were conducted to compare the variables on nationality.

2.3 RESULTS

The reliabilities of the scales are presented in Table 2.1**.** Overall, Cronbach's alphas were questionable to good.

Table 2.1. Cronbach's Alpha at time point A, B and C

Measurement	A	B	C	Items
Goal Orientation				
Performance-approach	.877	.875	.921	3
Performance-avoidance	-	.631	.636	3
Mastery-approach	.769	.794	.842	3
Mastery-avoidance	.744	.746	.852	3
Self-Efficacy	.629	.762	.686	19
Learning Behavior				
Deep approach	.775	.756	.797	10
Surface approach	.703	.789	.848	10

Changes over time in self-efficacy, goal orientation, and learning behavior

The means and standard deviations of the concepts of self-efficacy, goal orientation, and learning behavior at three time points are presented in Table 2.2 and Figure 2.1. All results are reported goal orientation, self-efficacy, and learning behavior.

Table 2.2. Means and standard deviations of goal orientation (7-point scale), self-efficacy (5-point scale) and learning behavior (5-point scale) at three time points A, B, and C

	A		B		C	
	M	*SD*	*M*	*SD*	*M*	*SD*
Mastery-approach	4.99	.88	4.77	1.09	4.48	1.13
Mastery-avoidance	3.78	1.34	3.35	1.26	3.30	1.24
Performance-approach	3.54	1.48	3.03	1.47	3.15	1.51
Performance avoidance	4.22	.75	4.09	1.14	4.14	1.04
Self-efficacy	3.55	.26	3.55	.32	3.44	.30
Deep learning	2.64	.57	2.63	.56	2.72	.58
Surface learning	2.88	.63	2.90	.65	3.11	.59

The student population was characterized by a high score on mastery-approach (*M* = 4.99; 4.77; 4.48) and on performance-avoidance (*M* = 4.22; 4.09; 4.14). Both performance-approach (*M* = 3.54; 3.03; 3.15*)* and mastery-avoidance (*M* = 3.78; 3.35; 3.30) were reported on an average level. Self-efficacy (*M* = 3.55; 3.55; 3.44) was reported on an average/high level and both deep learning (*M* = 2.64; 2.63; 2.72*)* and surface learning (*M* = 2.88; 2.90; 3.11) were reported on an average/below average level. As the mean score on the surface learning is higher than the mean score on deep learning (see Figure 2.1), the results show that the entire group of students report surface learning at each time point.

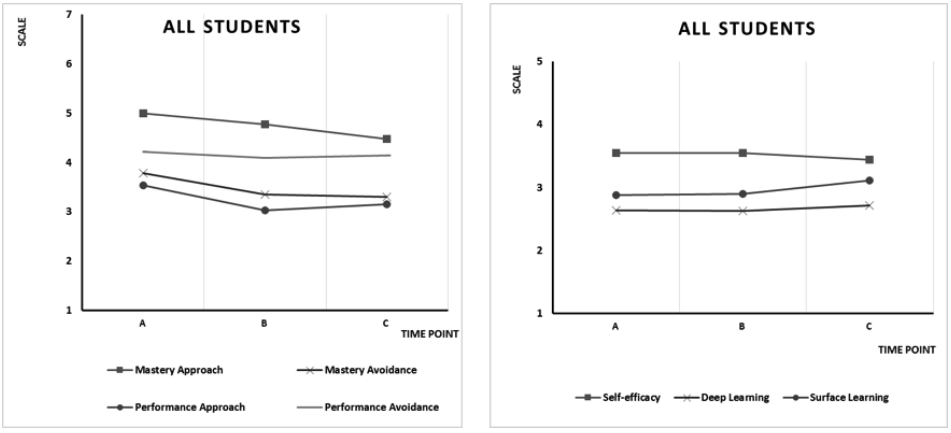

Figure 2.1. Changes over time for goal orientations (left diagram), self-efficacy, and learning behavior (right diagram)

A repeated measures ANOVA was conducted to determine whether there were significant differences in the variables over the eight weeks. Assumptions of sphericity and normal distributed data were tested, and a Friedman non-parametric test was run

in case the assumption of normality was violated. Mastery-approach decreased significantly from time point A to C; mastery-avoidance decreased significantly from time point A to C; performance-approach decreased significantly from time point A to B; self-efficacy decreased significantly from time point A to C; and surface approach increased significantly from point A to C (see Table 2.3).

Table 2.3. Repeated measures ANOVA

	df	*F*	*p*	*Posthoc Bonferroni*		ηp2
Mastery-approach	2, 102	7.755	.001	A → B	p=.185	.132
				B → C	p=.101	
				A → C	p =.002	
Mastery-avoidance	2, 102	5.272	.007	A → B	p=.056	.094
				B → C	p=1.00	
				A → C	p=.018	
Performance-approach[a]	2, 102	5.564	.005	A → B	p=.004	.098
				B → C	p=1.00	
Friedman test				A → C	p=.091	
				A → B	p=.018	
Performance-avoidance	2, 102	0.432	.650			
Self-efficacy[a]	2, 102	5.475	.006	A → B	p=1.00	.097
				B → C	p=.019	
				A → C	p=.007	
Friedman test				A → B	p<.0005	
				B → C	p<.0005	
Deep learning	1,636, 83,433	1.707	1.93			.032
Surface learning	2,102	8.682	<.0005	A → B	p=1.00	.145
				B → C	p=.007	
				A → C	p=.001	

[a]: The post-hoc analysis with a Bonferroni adjustment has been expanded with a Friedman test because of the violation of normally distributed assumption at two time points.

The changes over time differ partly between Dutch and German students (see Figures 2.2, 2.3, and 2.4). Significant changes for Dutch students are found in mastery-approach (i.e., a decrease from time A to C), in deep learning (i.e., an increase from time B to C) and in surface learning (i.e., an increase from time A to C). Significant changes for German students are found in mastery-avoidance (i.e., a decrease from time A to C), in self-efficacy (a decrease from time A to C) and in surface learning (i.e., an increase from time B to C). At time point C, German students scored higher on surface learning (*M* = 3.04) compared to deep learning (*M* = 2.77), whereas at time point A they scored contrariwise on surface learning (*M* = 2.72) and on deep learning (*M* = 2.95).

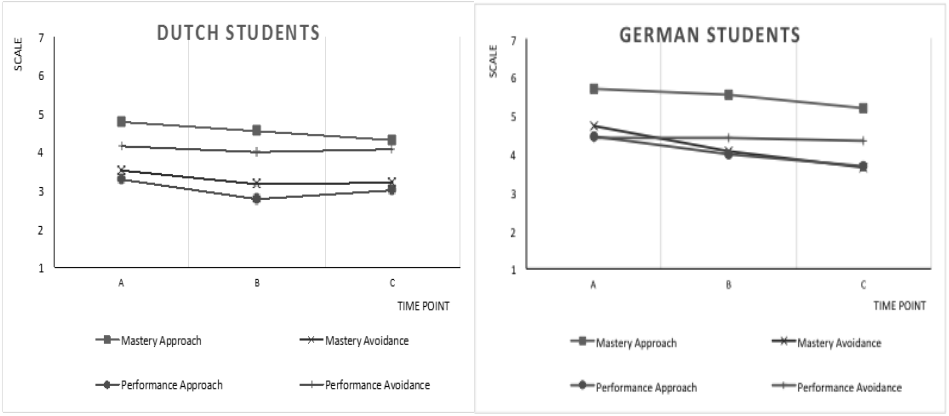

Figure 2.2. Changes over time for goal orientations Dutch and German students

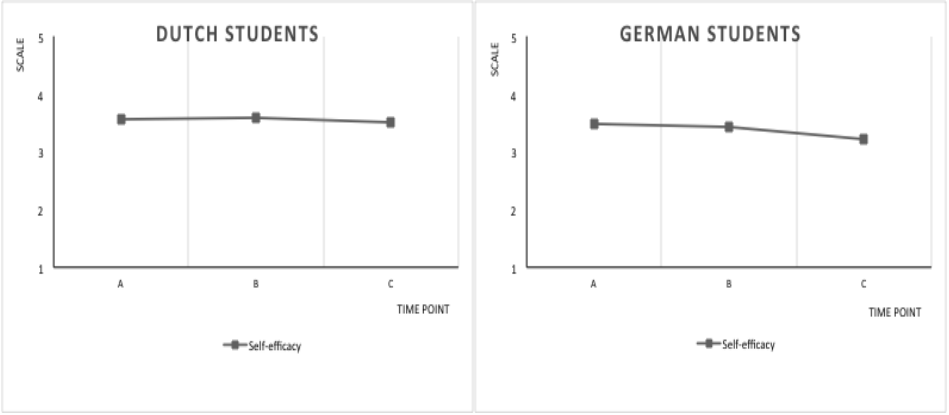

Figure 2.3. Changes over time for self-efficacy Dutch and German students

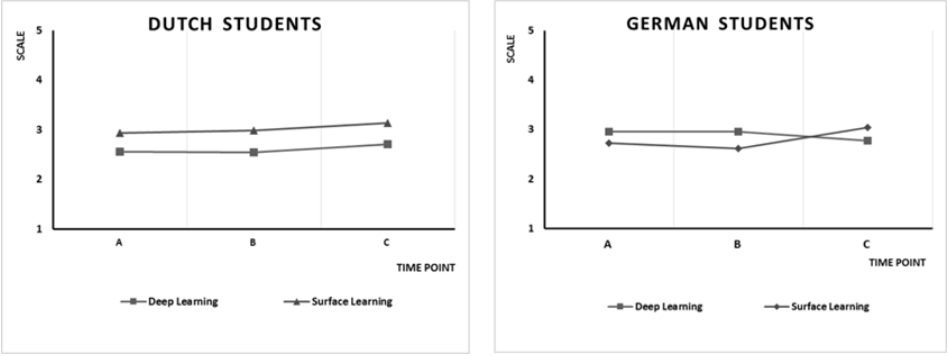

Figure 2.4. Changes over time for deep and surface learning Dutch and German students

The relationship self-efficacy, goal orientation, and learning behavior

Correlation analysis (see Table 2.4) was run to assess the relationship between the concepts of self-efficacy, goal orientation, and learning behavior at the three time points.

Table 2.4. Significant relationships between the concepts at three time points

Association	Time Point	r_s
Goal Orientation – Learning Behavior		
Mastery-approach – Deep learning	A	.493**
	B	*.601***
	C	*.676***
Mastery-avoidance – Deep learning	B	*.369***
	C	*.444***
Performance-approach – Deep learning	A	*.408***
	B	*.433***
	C	*.279**
Performance-avoidance – Deep learning	A	.295*
	B	*.440***
	C	*.483***
Mastery-approach – Surface learning	B	-407**
	C	-.433**
Self-efficacy – Learning Behavior		
Self-efficacy – Deep learning	C	.281*
Self-efficacy – Surface learning	C	-.250*

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

All goal orientations were significantly positively associated with deep learning, whereas mastery-approach at time point B and C was significantly negatively related to surface learning. Self-efficacy related at time point C positively significant with deep learning and negatively significant with surface learning.

A mixed model analysis confirmed the results based on Spearman's rank order correlation. All goal orientations related significantly positively with deep learning, and only the mastery-approach related significantly negatively with surface learning. Based on the mixed model analysis, a significant relationship was found between self-efficacy and the mastery-approach (see Table 2.5).

Table 2.5. Associations based on mixed model analyses

		df	*t*	*p*
Mastery-avoidance	→Deep learning	185.028	3.345	.001
Mastery-approach	→Deep learning	196.656	5.641	<.0005
Performance-approach	→Deep learning	195.771	4.257	<.0005
Performance-avoidance	→Deep learning	182.126	5.359	<.0005
Mastery-approach	→ Surface learning	194.559	-2.183	.03
Self-efficacy	→ Mastery-approach	195.262	3.197	.002

To investigate the multiple goal orientation the group of students scoring high on mastery-approach (i.e., > 4) were selected. This resulted in an average mean score on performance-avoidance (*M* = 4.34; 4.29; 4.36) above the group average score on performance-avoidance at all time-points. Additional selection of the group of students scoring high on performance-avoidance (i.e., > 4) resulted in an average mean score on mastery-approach (*M* = 5.17; 5.14; 4.89) above the average group score on mastery-approach at all time-points.

An independent-samples *t*-test was conducted to compare the different aspects in relation to nationality (see Table 2.6).

Table 2.6. Significant differences with respect to nationality

	Dutch		German				
	M	*SD*	*M*	*SD*	*t*	*df*	*P*
Surface learning							
B	3.06	0.620	2.59	0.601	2.771	69	.007
Mastery Approach							
A	4.70	0.918	5.72	0.665	-3.756	63	<.0005
B	4.53	1.030	5.31	1.063	-2.754	69	.008
C	4.33	1.141	5.14	0.979	-2.591	64	.012
Mastery Avoidance							
A	3.37	1.270	4.54	1.364	-2.936	63	.005
B	3.19	1.243	3.91	0.927	-2.226	69	.029
Performance Approach							
A	3.31	1.353	4.23	1.618	-2.116	63	.038
B	2.79	1.322	3.94	1.456	-3.113	69	.003
C	2.88	1.484	3.76	1.423	-2.146	64	.036
Self-Efficacy							
C	3.53	0.258	3.29	0.312	3.123	64	.003

Significant differences in the mean surface learning, mastery-approach, mastery-avoidance, performance-approach, and self-efficacy scores between German and Dutch students were reported. At time point B, Dutch students scored higher on surface learning (M = 3.06) and at time point C on self-efficacy (M = 3.53). German students scored significantly higher on mastery-approach at time point A (M = 5.72), B (M = 5.31) and C (M = 5.14), mastery-avoidance at time point A (M = 4.54) and B (M = 3.91) and performance-approach at time point A (M = 4.23), B (M = 3.94) and C (M = 3.76).

2.4 CONCLUSIONS AND DISCUSSION

The question underlying this study was "What is the relationship between self-efficacy, goal orientation, and learning behavior, and in which direction did these concepts change over time?" First, the main findings on the sub questions are presented and discussed, subsequently the practical implications, limitations and directions for future research are given.

RQ1. Do self-efficacy, goal orientation, and learning behavior change over time, and if so, in what direction?

The results provide evidence that self-efficacy, the goal orientations 'mastery-approach', 'mastery-avoidance' and 'performance-approach', as well as learning behavior all change over time during a teaching period. They are not stable traits during a teaching period. A decrease in self-efficacy, mastery-approach, mastery-avoidance and performance-approach and an increase in surface learning approach were found. Only the goal orientation 'performance-avoidance' did not change. For the total group, there was no reported change in deep learning approach, however after analyzing the results for nationality, reported deep learning decreased in German students while it increased in Dutch students.

RQ2. What is the relationship between self-efficacy, goal orientation, and learning behavior?

At the start of this study, four hypotheses about the relations between self-efficacy, goal orientation and learning behavior were formulated, namely:

H1. Self-efficacy is a predictor of the adoption of a specific goal orientation.

H2. Self-efficacy affects learning behavior.

H3. Goal orientation affects learning behavior.

H4. National background leads to different orientations and learning behavior.

H1 was partially confirmed; the mixed model analysis showed a significant relationship between self-efficacy and mastery-approach. However, there is no information on the

direction of the relation, it cannot be excluded that the direction of this relationship is reverse.
H2 was confirmed at time point C; a significant relationship was found between self-efficacy and (negatively) surface learning and (positively) deep learning.
H3 was confirmed by the significant relations between goal orientations and deep learning and between mastery-approach and surface learning. However, the other goal orientations were not associated with surface learning and the relation was not significant at all three time points.
H4 was supported by the significant differences in goal orientations and learning behavior between Dutch and German students.

Changes and relations during the execution of a substantial task.
Changes in self-efficacy, goal orientation, and learning behavior occurred over the course of execution the task. As was shown, self-efficacy, goal orientations (i.e., mastery-approach, mastery-avoidance, and performance-approach), and surface learning changed. Besides these changes over time, the significant relations, for mastery-approach, self-efficacy, and surface learning at the three time points changed as well. First, mastery-approach significantly decreased from time A to C. Surface learning significantly increased from time B to C. Furthermore, the relation between mastery-approach and surface learning was found to be significant negatively associated at two time points (i.e., time point B and C). In other words, the changeability that was shown (i.e., increase surface learning and decrease mastery-approach) is reflected in the negative relation between both concepts, which was expected from previous research (Liem et al., 2008).

Second, the reported self-efficacy decreased significantly from time point A to C, surface learning increased from time point B to C. At time point C, self-efficacy and surface learning significantly negative related to each other. The changes in self-efficacy and surface learning resulted in expected relations at time point C (Liem et al., 2008). It is noticeable that these changes occurred during a relatively short period (i.e., an eight-week teaching period), and that they occurred before the achieved performance outcomes could have been evaluated by the students. Therefore, it can be concluded that changes in these concepts occur within a relative short time period.

Explanation for these changes over a short time period might be students' perceptions of the learning environment and the associated requirements, and in line with this, their belief in a suitable learning strategy that would be beneficial to achieve the intended performance outcomes. Elliot (1999) stated that students who perceive themselves as being highly competent are expected to be directed toward positive outcomes and are expected to be willing participants (i.e., fostering a mastery-approach and/or performance-approach). In our study, mastery and performance orientations were positively associated with deep learning. Liem et al. (2008) suggested, the interpretation of the learning environment by students may lead to surface learning

when they expect that the assessment system would reward them with higher grades if they shift from deep to surface learning strategies or vice versa. This suggestion might give direction to the interpretation of the findings: the perception of the learning environment, the assessment system, and students' cultural background might be antecedents of reported learning strategies. In addition, the perceived increased work load during the eight-week teaching period might have directed the students towards surface learning, the students had to prepare themselves for a variety of assessments towards the end of the period. This shift towards surface learning and the relation with perceived work load was also found by Gijbels & Dochy (2006). In line with this explanation, Diseth (2011) suggested that learning strategies are a function of processes in the present learning context rather than a result of previous academic achievement. Therefore, knowledge about changes in self-efficacy, goal orientation, and learning behavior during a relatively short period of time is importance for educators.

Mixed nationalities and self-efficacy, goal orientation, and learning behavior

Within the research population, there were differences between Dutch and German students. At almost all time points, German students reported a significantly higher score on the mastery-approach, mastery-avoidance, and performance-approach while Dutch students reported a significantly higher score on the surface learning and self-efficacy at some time points. It seems that the way students approach and engage their learning tasks differs between Dutch and German students. If this is the case and the closely working teams are cross-national in their composition, then the cultural and national backgrounds need to be taken into account. Tutors should be aware of these possible differences to be able to guide their students according their personal characteristics. It is important that within the PBL-groups there is a balanced composition (i.e., there should be no majority of a specific nationality within a group). The findings are in line with research on the effects of nationality, underlying cultural practices, social norms, beliefs, and values on the way students approach tasks (Liem et al., 2008). Vermunt, Bronkhorst, and Martínez-Fernández (2014) concluded that differences with respect to learning orientations between students from different countries on one continent were often larger than the differences between students from different continents. In line with these findings, caution is recommended in drawing conclusions about typical German or Dutch behavior. Vermunt et al. (2014) suggested that research on the educational culture of various countries is necessary. Knowledge of the impact of cross-cultural differences and a better understanding of differences in learning behavior are necessary to support both teachers and students in international classrooms.

Based on the characteristics of both deep and surface learning, educators primarily attempt to foster deep learning in their students. The most important reason is that such an approach is associated with the intention to better understand the learning material, the desire to seek meaning, having an intrinsic interest in the material and

appropriately engaging the task (Biggs et al., 2001). In our study it is shown that deep learning did not significantly change over time, whereas surface learning significantly increased. However, it is noteworthy in our study that a shift was found in the German students from deep to surface learning. A plausible explanation for this might be that they evaluated the requirements of the course, determined that surface learning was sufficient and adjusted their behavior accordingly. This could be a wake-up call for instructors. As Biggs stated with respect to constructive alignment (1996), the objectives of learning, approach to teaching and learning and assessment of the intended learning outcomes need to be properly aligned. The German students apparently noted a discrepancy between these elements; that is, they determined that the goals and more probably the assessment was such that a surface learning behavior was sufficient. Their initially deep learning seems to arise from the fact that these students invest a lot by choosing to study abroad. Their learning goals may be affected by this choice. Student interaction, in terms of observing each other's behavior and responding to this behavior, between Dutch and German students, might also be an explaining factor for the adjustment of the learning behavior of German students.

Problem-based learning and self-efficacy, goal orientation, and learning behavior.
Our study was executed within a problem-based learning environment. The PBL environment students work in is characterized by working in small groups, thematic interdisciplinary education, skills training, and attitude development. Several studies assume a positive relationship between problem-based learning environments and deep learning (Groves, 2005), but not all the findings support this relationship. As Baeten, Kyndt, Struyven, and Dochy (2010) concluded in their review on student-centred learning environments (e.g., PBL) to stimulate deep learning that numerous factors in the learning environment affect students' learning behavior. Factors such as tutor supervision, feedback, and the forms and numbers of assessments seem to have a complex influence on self-efficacy, goal orientation, and learning behavior. Groves (2005) reported a shift into surface learning and stated that factors other than curriculum style, such as work load and assessment as a driver of student learning, might influence the learning behavior of students in problem-based learning environments. In line with Groves (2005), Davies (2009) reports that in general it is said that group work might promote deep learning, but it might also result in decreasing deep learning due to free riders (i.e., non-performing group members benefiting the accomplishments of the others) and sucker effects (i.e., individuals responding to free riders by freeriding themselves). Also the cultural diversity within groups influences the learning behavior the learners display. Because of these processes it is recommended that tutors explicitly discuss these differences with their students and a lot of effort is invested in the awareness of learners. Feedback directed at deep learning might help to alter surface learning of certain students into deep learning.

The problem-based learning environment might also be of influence of the students' goal orientation. Mastery and performance orientations have been traditionally viewed as singular orientations, since the goal orientation theory has been revised and the adoption of multiple goals seems to be more appropriate to reflect on the complex learning environments in higher education (Pintrich, 2000). This study supported this revised goal orientation theory; multiple goal orientations were found to be associated with deep learning strategies. The students with a high score on mastery-approach goals also reported themselves to be high on performance-avoidance goals; at first glance a noteworthy combination. Students seem to strive to master the learning tasks and at the same time are anxious that they will perform more poorly than their peers. No significant change over time in performance-avoidance was found. The 'strange' combination of goal orientations (i.e., mastery-approach and performance-avoidance) might reflect the group dynamics that played out during the eight-week period. Specifically, in a PBL-context in which students work closely with their peers, one can likely assume that the mastery-approach and performance-avoidance might mutually influence each other. Tutors should be aware of this and take these processes into account while tutoring. This might be done by adjusting the way they give feedback, and by stimulating dialogues between peers.

The overall research question was "What is the relationship between self-efficacy, goal orientation, and learning behavior, and in which direction do these concepts change over time?" Combining the relationship between the concepts and the changes over time presents the following picture: the significant relationship between all goal orientations and the deep learning behavior corresponded with a decrease in both mastery goals and performance- approach goals whereas the surface approach of learning significantly increased. Thus, one can conclude that, although the research period is short, these concepts changed during the course of carrying out a substantial task.

2.4.1 Limitations and future research

This study contributed to the growing body of research on self-efficacy, goal orientation, and learning behavior specifically in a PBL environment, since much research has been done in more traditional classroom settings. However, there are some limitations of this study that need to be considered. First, the sample size of the study was relatively small and prohibited the opportunity to test the conceptual model using path analyses, such as structural equation modelling. Advantage of a path analysis is the identification of interrelationships. Second, the findings were based on data from Dutch and German students who had to fill in questionnaires in Dutch. Although the German students study and discuss in Dutch in the PBL-groups, it might have affected their reports. Third, three measurements were carried out during an eight-week period

and students' motivation to fill in the questionnaires might have decreased. However, observations during the sessions in which the questionnaires were filled in did not show this. Fourth, is has to be noted that the Cronbach's alpha of performance-avoidance was insufficient at time point A and between .6 and .7 at time points B and C, therefore conclusions on performance-avoidance have to be drawn very cautiously. Finally, all measurements were self-reported measurements.

The proposed theoretical model in this study was partly confirmed but has to be expanded and elaborated in future, planned studies on the specific characteristics of the PBL environment (e.g., students' perceptions, tutor feedback, assessment) and the interpretation of results within international student populations. As was found that self-efficacy, goal orientation and learning behavior are not stable traits, it is important for future research to focus on specific ways to influence self-efficacy and goal orientation to, in the end, influence learning behavior in a positive way (i.e., achieve deep learning). PBL is a complex pedagogy in which it is desirable that students approach difficult tasks as challenges, that their interest and deep engrossment in activities is fostered, and that they set challenging goals and maintain strong commitment to them. As such, influencing students to exhibit high self-efficacy, to be driven by mastery orientations and/or performance-approach orientations, and to learn deeply is a priority. One avenue of future research might be to study how feedback might play a role here. Bandura (1977), for example, noted that feedback might support the process transforming low self-efficacy into high. With regard to goal orientations, Hoska (1993) stated that if a learning situation is structured to foster a particular type of goal, learners will respond in kind. In fact, she claims a learner's goal orientation can temporarily and, over time, permanently be altered by intervention. Feedback interventions to alter the goal orientation into a mastery orientation or performance-approach goal need to be aligned to: the learners' view of intelligence, the environment and the focus on developing skills and gaining knowledge. These complex interacting variables in the learning environment in relation to feedback, self-efficacy, goal orientations, and learning behavior is the focus of our future research.

3

Goal Orientation, Deep Learning, and Sustainable Feedback in Higher Business Education

This chapter is based on:

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P. A. (in press). Goal orientation, deep learning, and sustainable feedback in higher business education. *Journal of Teaching in International Business.*

ABSTRACT

Relations between and changeability of goal orientation and learning behavior have been studied in several domains and contexts. To alter the adopted goal orientation into a mastery orientation and increase a concomitant deep learning in international business students, a sustainable feedback intervention study was carried out. Sustainable feedback implies acknowledgment of students' need to be actively involved in their own feedback process. First, relations between and changeability of the concepts found in previous research were validated. Second, the effects of the sustainable feedback intervention were analyzed. Although sustainable feedback helped mastery-oriented learners maintain deep learning, it did not directly influence their goal orientations.

3.1 INTRODUCTION

Students in higher education live and study in a rapidly changing and globalizing world that affects the content they study and the ways they study. Although the primary goal of higher education is the "production" of experts who are masters in their field (Fryer & Elliot, 2007), students often choose the path of least resistance. The production of experts is known as a mastery orientation with respect to learning and has been associated with deep learning, while the "least resistance" path is known as a performance orientation associated with more surface learning (Elliot & McGregor, 2001). In the field of international business, students need to make use of deep learning behavior to optimally develop problem-solving and critical thinking skills (Paul & Mukhopadhyay, 2004). Ideally, higher education in international business should stimulate students to develop and maintain a mastery orientation to learning and to use a deep learning behavior or to change their existing performance orientation to one of mastery to stimulate deep learning.

The concept of goal orientation is based on a social-cognitive theory of achievement motivation that specifies the kinds of goals that direct achievement-related behaviors (Maehr & Zusho, 2009). Goal orientation research has its origin in a dichotomous framework distinguishing mastery and performance goals (Dweck & Legget, 1988). When the orientation is toward truly understanding or mastering what is being taught or at least getting better at something, one speaks of a *mastery orientation.* An orientation toward simply obtaining a grade and/or outperforming others is a *performance orientation* (Elliot & Dweck, 1988). Elliot (1994) expanded the dichotomous framework by adding approach and avoidance motivations to the performance orientation. In other words, performance-*approach* orientations refer to demonstrating competence relative to others (i.e., being competent enough to pass a test), and performance-*avoidance* orientations refer to avoiding a demonstration of a lack of competence relative to others (i.e., not doing worse than classmates). A 2 x 2 framework was thus established by also adding approach and avoidance motivations to the mastery orientation (Elliot, 1999; Elliot & McGregor, 2001). Mastery-*approach* oriented students are interested in truly mastering an academic task; in contrast, mastery-*avoidance* oriented students are interested in avoiding a misunderstanding of the task.

In previous research, the different frameworks were all used, leading to difficulties in comparing the obtained results. Huang (2012) conducted a meta-analysis (i.e., N = 52,986 participants analyzed in 151 studies) to examine the discriminant and criterion-related validity of the achievement goal models (i.e., dichotomous, trichotomous, and 2 x 2 frameworks) in predicting academic achievement. He concluded that the 4-factor achievement goal model (i.e., 2 x 2) is the best model to gain an understanding of learning outcomes.

Research on goal orientation addresses questions about why students engage in academic work the way they do (Huang, 2012). According to DeShon and Gillespie (2005), studies of goal orientation focus on the choice of behavior in achievement situations. Performance orientation involves an interpersonal desire to demonstrate competence and/or to outperform others, while mastery orientation is an intrapersonal desire to enhance competence (Senko, Hulleman, & Harackiewicz, 2011). The underlying performance orientation related desires of *competence demonstration* or *outperforming others* did not exclude each other in previous research. However, in reality, students are often led by the desire to pass their exams instead of the desire to outperform others as a way of demonstrating their competence. It should be noted that students oriented toward mastery-avoidance are driven by an intrapersonal desire to master a task, but they are also afraid of failing. If one of the goals of higher education is to influence these choices in a particular direction, then it is imperative that the factors influencing students' choices are understood. However, not only the influencing factors are of interest: the time period in which goal orientations can change is of interest as well. As it is known that the choice of behavior (i.e., goal orientation) is related to achievement situations, it is worthwhile knowing if and how goal orientations change over the course of carrying out a substantial task. Ideally, from a learning perspective, teachers prefer working with students with the aim of the students' mastering knowledge and skills. But this ideal is not always shared by what some refer to as "calculating" students and teachers (Van Bijsterveldt, 2011), because they are often directed to gaining credits and achieving high graduation rates in a short time. In reality, many factors such as time and efficiency might cause a more performance-oriented approach.

Elliot and McGregor (2001) found that goal orientations led to different patterns of learning behavior. A distinction in such behaviors is found between surface learning and deep learning (Biggs, Kember, & Leung, 2001; Entwistle, 1991). The latter is characterized by strategies such as elaborating on ideas, thinking critically, and linking or integrating one concept with another. Deep learning directs a student's attention toward comprehending what the author wants to say. It is associated with a willingness to understand and be engaged in meaningful learning. Surface learning, on the other hand, is characterized by strategies such as rote learning and reproduction of the learning materials and is associated with an economic way of being engaged in learning (Aharony, 2006; Biggs, 1987; Vanthournout, Coertjens, Gijbels, Donche, & Van Petegem, 2013). Deep learning behavior matches the need for international business students to become problem-solving, creative, life-long learners, so that they will be able to meet the demands of working in a rapidly changing, globalizing business environment. Critical competencies for business undergraduates entering the business working field are, for example, critical and analytical thinking and the ability to see the bigger picture (Azevedo, Apfelthaler, & Hurst, 2012). These skills emphasize the need for enhancing deep learning in these students. Mastery goal orientations have been shown to trigger a

deep-level, strategic processing of information, while performance approaches have been shown to trigger superficial, rote-level processing (Elliot, McGregor, & Gable, 1999; Covington, 2000; Elliot & McGregor, 2001). Just like the mastery orientation, deep learning is favored by educators because of the willingness of students to really understand the learning material (Aharony, 2006).

The learning behavior that students adopt can be influenced by both the learning context and the task (Biggs, Kember, & Leung, 2001). This means that the discipline of study, such as international business, might affect the learning behavior that students' display. It can be questioned whether the specific learning environment within a specific domain of study affects the adopted learning behavior or that students with a specific, preferred learning behavior enroll in a study program that suits them best (Smith & Miller, 2005). A study on the relation between discipline and learning behavior found that business students favor a surface learning approach for their study (Smith & Miller, 2005). This was debated by Pang, Ho, and Man (2009), because of the presented dichotomous view of deep and surface learning in the study of Smith and Miller. Pang et al. found that business students switched and transferred between learning behaviors, presumably due to the practical orientation of business education aimed at preparing students for commercial functions. Knowledge of both learning behaviors and goal orientations sheds light on *what* students are trying to achieve but also on *why* they are trying to do so (Cano & Berbén, 2014). As a mastery orientation and concomitant deep learning are desirable in education from a learning point of view, it is important for educators to know how to influence the goal orientation of students toward this orientation and approach. Specifically, first-year students have been found to display a 'novice' learning profile, meaning low scores on both deep and surface learning (Gijbels, Van de Watering, Dochy, & Van den Bossche, 2005). This 'novice' profile has been associated with low study success (Lindblom-Ylänne, 2003) and therefore it is worthwhile to investigate how first-year students can be guided to display a learning profile in accordance with the demands of their future working environment.

DeShon and Gillespie (2005, p. 1114) conceptualized goal orientation as "a label used to describe the pattern of cognition and action that results from pursuing a goal at a *particular* point in time in a *specific* achievement situation." This could be interpreted to mean that a person is able to switch goal orientations over the course of working on a task, within for example, business education. This implies that goal orientations are not fixed but can change. Changes in goal orientation have been found by Winne, Muis, and Jamieson-Noel (2003), Muis and Edwards (2009), and Fryer and Elliot (2007). However, their findings did not always point in the same direction or the same interrelation between the goal orientations. Nor was the amount of variation the same for all types of goal orientation. Muis and Edwards (2009) found that mastery-approach orientations displayed the most variation, followed by the performance-approach, with performance-avoidance being most stable over the course of a task.

The causes of these changes and differences are not really clear. The researchers did not find solid evidence for the task itself being the cause of either change or stability, but there is some evidence that feedback might cause the variation. For example, in Winne et al. (2003), positive feedback resulted in a decrease of performance-avoidance orientation, and negative feedback resulted in a decrease of performance-approach orientation. Although most of the studies report group means, Fryer and Elliot (2007) examined changes in goal orientation at both the sample and the individual levels. At the sample level, they found a decrease in the mastery-approach and an increase in performance-avoidance between two exams, whereas performance-approach and mastery-avoidance goals remained stable. At the individual level, they found increases and decreases, respectively, in performance-approach and mastery-avoidance that canceled each other out when combined at the sample level. They did not, however, study the causes of these differences.

Senko et al. (2011) conceptualized that students might be able to switch during an academic period, starting with a mastery orientation and then switching to a performance orientation before starting to prepare for exams, when focusing on outperforming their peers. It is useful to gain more knowledge on the changeability of goal orientation during a relatively short period, because this knowledge might help educators to better guide their students towards exhibiting a mastery orientation. However, the switch Senko et al. (2011) conceptualized might not really be a switch, as Pintrich (2000) found that it is possible to simultaneously adopt multiple goals. Maehr and Zusho (2009) discussed that students with high levels of both mastery and performance goal orientations might be most successful because of the opportunity to select the most suitable approach in an achievement situation. In other words, the ideally valued mastery orientation is combined with the often observed performance orientation. Research into the switch between a goal approach and a goal avoidance behavior and the corresponding predictors is limited. Table 3.1 shows an overview of the characteristics of the four goal orientations. More research is necessary to better inform teachers why these orientations occur and how they as teachers can play a role in influencing the goal orientation to enhance deep learning.

Table 3.1. Goal orientations and differential effects on learning

	Approach	Avoidance
Performance	• Goal is to demonstrate ability compared to others. • Extrinsic goal value/normative standards • Interested in competition, demonstrating their competence, and outperforming others • Use other students as points of comparison, rather than themselves • Focus on outcome • Interested in demonstrating higher competence than other students • Seeking flattering information • Surface learning	• Goal is to demonstrate ability compared to others • Extrinsic goal value/normative standards • Interested in competition, demonstrating their competence, and outperforming others • Use other students as points of comparison, rather than themselves • Focus on outcome • Interested in avoiding appearing incompetent or stupid • Avoiding unflattering judgments • Surface learning
Mastery	• Goal is to truly understand or master the task at hand • Intrinsic goal value/personal standards • Interested in self-improvement • Compare their current level of achievement to their own prior achievement • Interested in truly mastering an academic task • Seeking accurate information about ability • Focus on process • Deep learning	• Goal is to truly understand or master the task at hand • Intrinsic goal value/personal standards • Interested in self-improvement • Compare their current level of achievement to their own prior achievement • Interested in avoiding misunderstanding the task • Avoiding unflattering judgments • Shifting from process to outcome • Deep learning

3.1.1 Feedback as a tool to influence the adoption of a specific goal orientation and learning behavior

Feedback is a powerful instrument to improve learning (Hattie & Timperley, 2007; Kluger & DeNisi, 1996). Hattie's (2013) meta-study on the effect of feedback on learning shows an effect size of .75. The effect of feedback extends further than 'just' learning for a task; it might also affect students' development, reflection, and improvement of future work (Blair, Wybum-Powell, Goodwin, & Shields, 2014). Feedback directed at students' engagement in the learning process - through dialogues between teachers and students or among peers - might increase their satisfaction with feedback and their ability to learn from and understand feedback. How students use feedback might be related to their goal orientation; Evans (2013) stresses interest in investigating the relation between goal orientations and the way feedback is used and interpreted. Winne et al. (2003) found a relation between feedback and goal orientations, but they did not find an increase of mastery-approach orientation. A possible reason might be in the kind of feedback provided in that study; students received what could be called unidirectional feedback on a task from their teacher. According to Boud and Molloy

(2013), the most powerful use of feedback is not in the way Winne et al. implemented it; to be as powerful as possible, it is important to shift the focus of feedback from telling or providing feedback to sustainable feedback. Sustainable feedback means a shift from information merely transmitted to students to the acknowledgment of the need for students to be actively involved in their own learning and to be agents of their own change. In concrete terms, this means students asking for and seeking feedback. Students have to give meaning to feedback, for example, through discussions, before they can use it. According to Boud and Molloy (2013), sustainable feedback focuses on the purpose of the feedback and not only on the learning outcomes. It stimulates students to seek and solicit feedback with who, what, where, when, and how questions, and it asks tutors and peers to provide performance information to the learner. It encourages students to articulate judgments (self-evaluation), and it has students compare internal and external judgments and decide how to meaningfully interpret these messages; the comparison of both types of judgment in relation to the standards has to be used to generate a plan for improved work. Also, sought and solicited feedback and the evaluative comparison should not lead to a formal judgment (summative assessment).

In feedback processes, it is important to take into account the position of the student in relation to other students. Dialogue between peers is an important feature of feedback (Nicol & MacFarlane-Dick, 2006). As collaboration between peers is part of the learning process in groups, the sustainable feedback should fit the learning objectives of the group. Advantages of feedback by peers is that peers have equal status and training, so their relationship is not disturbed by a hierarchical relationship, and the feedback is often more timely and immediate (Finn & Garner, 2011). Group work is commonly used as an educational approach in higher education to prepare students for their future working environment. The aims of utilizing group work as an educational approach are to construct knowledge as a result of collaboration between peers and to develop skills such as argument, conflict handling, and analysis. Tutors guiding this group work play a role in the process of constructing knowledge and skills (Chng, Yew, & Schmidt, 2011). Chng et al. (2011) found that the interpersonal qualities of the tutor have a significant influence on the learning process.

While the findings of Winne et al. (2003) made clear that feedback could be used to alter goal orientations, the suggested approach of Boud and Molloy (2013) might be more effective in stimulating a mastery-approach. The assumption is that when students actively seek feedback, instead of unidirectionally receiving tutor feedback, they themselves are in control and can give meaning to the feedback and discuss it on an equal level with their peers. They learn not to experience feedback as a threat or as an embarrassment but as a natural part of the learning process.

The question is whether sustainable feedback alters the adopted goal orientation of first-year bachelor students from a performance to a mastery orientation and thus also alters the learning behavior from surface learning to deep learning. To investigate this,

first a replication study is carried out to validate previous findings in this specific Business Administration context with the following research questions:

RQ1. What is the relation between goal orientation and learning behavior? It is expected that students reporting a mastery orientation also show deep learning, and students reporting a performance orientation also show surface learning. In this study these findings will be validated.

RQ2. Do goal orientation and learning behavior indeed change over time, and if so, in what direction? Previous findings support the changeability of goal orientation and learning behavior; in this study, these findings will be validated.

Secondly, the effect of sustainable feedback on goal orientation and learning behavior is investigated:

RQ3. What are the effects of sustainable feedback from peers and tutors on goal orientation and learning behavior? It is expected that a mastery goal orientation and deep learning will manifest itself.

3.2 METHOD

3.2.1 Context

This experiment was conducted in a first-year higher education Bachelor of Business Administration course in the Netherlands. The academic year is divided into four periods of eight weeks, and the experiment was carried out in the third period of the students' first year. The students worked together in problem-based learning (PBL) groups consisting of 12 students, solving practical domain-specific problems, meeting twice a week. The learning environment is composed of group work and individual work. The scheduled work load in the third period is 15 European Credits (EC; 1 EC=28.35 hours of study), of which 3 ECs are for PBL group work and 4 x 3 EC are for courses on subjects related to a practical problem. The students already gained PBL experience in the two previous teaching periods (i.e., in total one semester).

Each group was subsequently split into two smaller groups during the elaboration of the tasks. In the day-to-day execution of PBL, the instructions for tutors and students with guidelines for feedback were described in a PBL manual.

3.2.2 Participants

Participants were 105 first-year students in Marketing (N = 105, 54 male, 51 female; M_{age} = 20.29; SD = 2.37; range: 17–30 years) divided among 12 PBL groups guided by 7 tutors.

An overview of tutors, groups, and conditions is given in Table 3.2.

Table 3.2. The distribution of tutor group over tutors and experimental and control condition

Tutor	Experimental condition	Control condition
1	Groups 7 and 8	
2	Groups 3 and 4	
3	Groups 1 and 2	
4		Groups 5 and 6
5	Groups 9 and 10	
6		Group 12
7		Group 11

3.2.3 Design

To investigate the effect of sustainable feedback on goal orientations and learning behavior, an experimental pre-test-post-test nonequivalent group design intervention study (Experimental: N = 62; Control group: N = 43) was carried out. Existing groups were randomly assigned to the conditions, taking into account that different groups were in the same condition (see Table 3.2). As a consequence, the numbers of students in the conditions are not equal.

3.2.4 Instruments

Two questionnaires were used, both having been used in previous research among undergraduate students.

- Goal orientation was measured using a validated translated version of the Achievement Goals Questionnaire (Elliot & McGregor, 2001), a 12-item measure that assesses learners' orientation on a 7-point Likert scale. The questionnaire represents the 2 x 2 model (Huang, 2012).
- Learning behavior was measured using a validated translated version of the R-SPQ-2F (Biggs et al., 2001); a 20-item, 5-point Likert scale. This is one of the most commonly used questionnaires in higher education, in which learning behavior is described using the two factors, deep and surface learning (Baeten, Kyndt, Struyven, & Dochy, 2010).

Information about sex and age was registered at the beginning of the experiment.

3.2.5 Procedure

The procedure of the feedback intervention is presented in Table 3.3.

Table 3.3. Procedure of the feedback intervention

	Procedure of feedback intervention
Week 0	• Tutors of the experimental PBL groups were given instructions on feedback.
Week 1: first meeting of the week	• Students filled out questionnaires measuring self-efficacy and learning behavior. • Students received a bundle of feedback forms. • Students wrote down individual learning points based on their experience in PBL groups in periods 1 and 2. • Learning points were formulated as a question and related to aspects of collaboration in PBL groups.
Week 1: second meeting of the week	• Members of each group shared their feedback questions with their peers and tutor. • Everyone was in possession of all the feedback questions.
Weeks 2, 3, and 4	• The tutor stimulated and guided the students to seek feedback on their own feedback questions. • All students wrote down their own judgments (evaluation) of their performance on the specific learning points (i.e., feedback questions). • At the end of every meeting, the students had to write down the feedback they sought and the feedback message they received.
Week 4: second meeting	• An evaluative moment in which all students had to compare their own judgments with the external judgments. • If a student was satisfied with the feedback, then it was possible to rephrase the feedback questions to be able to ask and seek feedback for other learning points from that point on.
Week 5: first meeting	• All (rephrased) feedback questions were shared amongst the students.
Weeks 5, 6, 7, and 8	• The tutor stimulated and guided the students to seek feedback on their own feedback questions. • Students wrote down their own judgments (evaluation) of their performance on the specific learning points (i.e., feedback questions). • At the end of every meeting, the students had to write down the feedback they sought and the feedback message they received.
Week 8: second meeting	• The feedback questions were evaluated within the PBL group. • Students filled out the questionnaires on self-efficacy and learning behavior. • There were no formal (summative) judgments of the feedback process.
Week 9	• Submission of PBL assignment and examination of the supporting courses (written tests).

3.2.6 Data analysis

Data analysis started with descriptive analyses to summarize the data. To check whether goal orientation and learning behavior were comparable among experimental and control conditions, an independent *t*-test was conducted at pre-test. To check differences between PBL groups at pre-test, a one-way ANOVA Bonferroni post hoc analysis was conducted. To answer RQ1 (i.e., relation between goal orientation and learning associations), a correlation analysis was conducted. A mixed-model analysis was used to assess the associations and directions between goal orientations and learning behavior over time. The mixed-model analysis is an expansion of a regression analysis; to take the two measurements per student into account, the dataset was transformed into a vertical structure. RQ2 (i.e., changes in goal orientation and learning behavior) was answered conducting a paired *t*-test to investigate changes over time within the experimental and control groups. Additional to these *mean-level* analyses, an *individual-level* analysis was conducted by calculating the reliable change index (RCI; Zahra & Hedge, 2010). The RCI is calculated by dividing the difference in pre-test and post-test scores by the standard error of the difference score. Individuals are characterized as showing either a significant increase, a significant decrease, or no significant change from pre-test to post-test. RCI values smaller than -1.96 or larger than +1.96 are unlikely to occur by chance (Fryer & Elliot, 2007). The RCI calculator of Zahra (2010) was used. For RQ3 (i.e., the effect of the intervention on goal orientation and on learning approaches), a multiple regression analysis was conducted to determine the overall fit (variance explained) of the model, and the relative contribution of each of the predictors of the total variance was explained.

3.3 RESULTS

Reliabilities of the scales (Cronbach's alpha) are presented in Table 3.4. Overall, the Cronbach's alphas (Nunnally, 1978) were questionable to good. One item of the performance-avoidance scale was removed to improve the internal consistency of the scale (i.e., "My fear of performing poorly in this class is often what motivates me").

Table 3.4. Cronbach's alpha at pre-test and post-test

Measurement	Pre-test	Post-test	Items
Goal Orientation			
Performance-approach	.78	.87	3
Performance-avoidance	.67	.61	2
Mastery-approach	.78	.71	3
Mastery-avoidance	.63	.65	3
Learning Behavior			
Deep learning	.79	.83	10
Surface learning	.68	.76	10

Mean scores, standard deviations for the group as a whole, and the experimental and control conditions are presented in Table 3.5.

Table 3.5. Means, standard deviations at pre-test and post-test, control, experimental, and total groups

	Control		Experimental		Total	
	M	SD	M	SD	M	SD
PAp Pre	3.85	.97	3.41	1.60	3.59	1.39
PAp Post	4.21	1.18	3.68	1.47	3.90	1.38
PAv Pre	4.34	1.39	5.12	1.37	4.80	1.42
PAv Post	4.69	1.21	5.07	1.21	4.91	1.21
MAp Pre	4.91	1.14	5.28	1.12	5.13	1.14
MAp Post	4.98	.85	4.99	1.06	4.99	.98
MAv Pre	3.53	1.08	3.80	1.21	3.69	1.16
MAv Post	3.74	1.09	3.71	1.17	3.72	1.13
DL Pre	2.72	.49	2.97	.67	2.87	.61
DL Post	2.70	.57	3.00	.59	2.88	.60
SL Pre	2.57	.44	2.73	.62	2.67	.59
SL Post	2.75	.58	2.81	.61	2.79	.59

Note. Pre=pre-test; Post=post-test; PAp= Performance-approach; PAv=Performance-avoidance; MAp=Mastery-approach; MAv=Mastery-avoidance; DL=Deep learning; SL=Surface learning.

Preliminary, independent *t*-test analyses showed a significant difference on performance-avoidance ($t = -2.867$; $df = 102$, $p < .05$) and deep learning ($t = -2.058$; $df = 101$, $p < .05$). No significant differences between groups were found; however, the one-way ANOVA showed significant differences between tutors on performance-avoidance at pre-test $F(6, 97) = 2.293$, $p = .041$, and Bonferroni post hoc analysis showed a significant difference between the highest scoring in the groups with tutor 2 ($M = 5.37$; $SD = 1.141$) and the lowest scoring in the groups with tutor 6 ($M = 3.69$; $SD = 1.614$; $p = .037$). These differences are taken into account in further analyses.

RQ1. What is the relation between goal orientation and learning behavior?

To gain insight into the relations between goal orientation and learning behavior, correlations were calculated over the total group (Table 3.6). At pre-test, all goal orientations, except performance-avoidance, were significant positively correlated with deep learning. A performance-approach had a significant negative correlation with surface learning. At post-test, a positive significant relation was found between a mastery-approach and deep learning, and a negative significant relation was found between a mastery-approach and surface learning.

Table 3.6. Correlations between goal orientations and learning behaviors at pre-test and post-test

	Perfor-mance approach pre-test	Perfor-mance avoidance pre-test	Mastery approach pre-test	Mastery avoidance pre-test	Perfor-mance approach post-test	Perfor-mance avoidance post-test	Mastery approach post-test	Mastery avoidance post-test
Deep learning pre-test	.41**	.13	.50**	.32**				
Surface learning pre-test	-.25*	.17	-.06	.09				
Deep learning post-test					.15	.16	.42**	.13
Surface learning post-test					-.09	-.05	-29**	-.05

* Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)

In the experimental condition, the mixed-model analysis showed that both a mastery-approach and a performance-approach related significantly positively with deep learning over the course of time. A mastery-approach and mastery-avoidance related significantly negatively with surface learning (see Table 3.7). In other words, while both a mastery-approach and a performance-approach orientation related positively to deep learning, both mastery orientations related negatively to surface learning.

Table 3.7. Significant associations based on mixed-model analyses, experimental condition

		df	*t*
Mastery-approach	→Deep Learning	120.993	6.141**
Performance-approach	→Deep Learning	119.953	4.896**
Mastery-avoidance	→Surface Learning	88.974	-2.785**
Mastery-approach	→Surface Learning	105.415	-2.152*

* significant at the .05 level
** significant at the .01 level

In the *control group*, mastery-avoidance related significantly positively with surface learning (t = 2.71, df = 71.297, p = .009).

RQ2. Do goal orientation and learning behavior indeed change over time, and if so, in what direction?

Changes over time in goal orientation and learning approach are presented in Table 3.8.

Table 3.8. Changes over time of goal orientations and learning behavior in the group as a whole, the experimental group, and control group

Sample	Orientation or Behavior	Change	Cohen's d
Total group	Performance-approach	.305	.29**
	Surface learning	.134	.29**
Experimental group	Mastery-approach	-.290	.26*
	Performance-approach	.269	.25***
Control group	Performance-approach	.367	.35*
	Surface learning	.190	.38*

* significant at the .05 level
** significant at the .01 level
*** significant at the .1 level

A performance-approach increased in both groups, whereas a mastery-approach decreased in the experimental group and surface learning only increased in the control group.

In other words, *all* students became more performance-approach oriented; the students lacking the feedback intervention increased in surface learning, and the students in the experimental condition decreased in a mastery-approach, with a concomitant increase in surface learning.

Mean-level change was complemented with an *individual-level* change by calculating the RCI; see Table 3.9.

Table 3.9. Reliable change in self-efficacy and learning behavior for the group as a whole, experimental group, and control group

	Pre-test - post-test Group as a whole		Pre-test - post-test Experimental group		Pre-test - post-test Control group	
	% decrease	% increase	% decrease	% increase	% decrease	% increase
Performance approach	1.0	2.9	1.6	1.6	4.7	9.3
Performance avoidance	1.9	4.8	3.3	3.3	0.0	7
Mastery approach	2.9	2.9	4.8	1.6	0.0	4.7
Mastery avoidance	2.9	4.8	4.8	1.6	0.0	9.3
Deep learning	21.4	17.5	0.0	1.6	21.4	14.3
Surface learning	14.4	28.8	16.1	27.4	11.9	31

In the group *as a whole* all goal orientations remained stable, deep learning showed more students decreasing than increasing (increase 17.5%, decrease 21.4%, stable 61.1%) and surface learning showed more students increasing than decreasing (increase 28.8%, decrease 14.4%, stable 56.8%).

In the *experimental group* all goal orientations also remained stable on an individual level, and deep learning also remained stable. Surface learning showed a pattern of more students increase significantly different from what would be expected if change were random (increase 27.4%, decrease 16.1%, stable 56.5%). In other words, the students maintained their deep learning behavior but also reported an increase of surface learning.

In the *control group*, on an individual level more significant changes were found, deep learning showed more students decreasing than increasing (increase 14.3%, decrease 21.4%, stable 64.3%) whereas surface learning showed more students increasing than decreasing (increase 31.0%, decrease 11.9%, stable 57.1%). In other words, students who did not receive the feedback intervention decreased in their deep learning and reported the largest increase in surface learning.

RQ3. The effect of sustainable feedback on goal orientations and learning behavior

Standard multiple regression analyses were performed to examine the influence of the intervention on the goal orientations and learning behavior. The assumptions of linearity, independence of errors, homoscedasticity, unusual points, and normality of residuals were met. The outcomes were controlled for differences in tutor group and the pre-test scores. The students' performance-approach at pre-test (B = .698, p < .0005), the tutor group (B = -.135, p < .047), and the feedback intervention (B = -.568, p < .03) predicted the post-test performance-approach ($F(3, 101) = 37.03$, p < .0005, R^2 = .524). Beta weights and their associated t-values are presented in Table 3.10. A significant

negative effect for the intervention was found only for the performance-approach. No significant effects of the intervention were found for the other goal orientations or learning behavior.

Table 3.10. Multiple regression performance-approach, intervention, tutor group

					95% Confidence Interval for B	
	B	SE	Standardized Beta	*t*	Lower Bound	Upper Bound
(Constant)	2.257	.462	.703	4.88**	1.341	3.174
Intervention	-.568	.258	-.204	-2.198*	-1.081	-.055
Tutor group	-.135	.067	-.186	-2.007*	-.269	-.002
PAp-1	.698	.069	.703	10.089**	.560	.835

Dependent Variable: PAp-2

Note. PAp-1=Performance-approach, pre-test; PAp-2=Performance-approach, post-test.

* significant at the .05 level

** significant at the .01 level

3.4 CONCLUSION AND DISCUSSION

The research questions underlying this study addressed a replication of previous research to study the relation between goal orientation and learning behavior, and the changeability of these concepts within the domain of international business. Replication studies imply the use of the same methods. While we are replicating several studies with different methodologies, we have used analyses on mean-level and individual-level. Furthermore, the effect of sustainable feedback on goal orientation and learning behavior was investigated. First, the main findings are presented, and discussed. Subsequently, methodological and practical implications are given.

Main findings

Several significant relations between goal orientation and learning behavior (RQ1) were found, see Table 3.11.

Table 3.11. Overview of significant relations between goal orientations and learning behaviors

	Relations		
	All	*Exp*	*Con*
Mastery-approach (MAP)	DL+	DL+	
	SL-	SL-	
Mastery-avoidance (MAV)	DL+		
		SL-	SL+
Performance-approach (PAP)	DL+	DL+	
	SL-		
Performance-avoidance (PAV)			

Note. All = Total of all of the groups; Exp = Experimental group; Con = Control group

The significant relation between mastery-approach and deep learning in our study was found in previous research as well (Elliot, McGregor, & Gable, 1999; Covington, 2000; Elliot & McGregor, 2001).

Results on the second research question (RQ2), namely whether goal orientations and learning behavior change over time, revealed a significant increase of a performance-approach in both the group as a whole as well as in the experimental and control groups separately. In the experimental condition, the mastery-approach decreased significantly. Surface learning significantly increased in the group as a whole and in the control condition. As these findings are contrary to our expectation, analyses on an individual level were carried out.

These analyses showed an increase in surface learning in the experimental and control group and a decrease in deep learning in the control group. Deep learning did not change (i.e., remained stable) in the experimental group. Also, this was not what we expected and will be discussed later in the Conclusion and Discussion section.

Finally, in this intervention study, we expected that after a feedback treatment in which students had to actively ask and search for feedback, a mastery goal orientation and deep learning would manifest itself (RQ3). However, multiple regression analysis showed only a significantly negative effect of sustainable feedback for the performance-approach. There was also a significant difference in the performance-approach caused by differences between the tutor groups (negatively) and the previous performance-approach scores (positively). In other words, the intervention and the tutor group negatively influenced the score on performance-approach at post-test; this might imply that the sustainable feedback and the collaboration in the tutor group limited the increase in using a performance-approach (i.e., achieving passing grades). So the expected change to a mastery approach and change to deep learning as a result of the intervention was not found.

Relations and changes over the course of time

The main findings, as presented, mainly confirmed previous research (i.e., the relation between mastery-approach and deep learning and changeability of mastery-approach and performance-approach). However, some results in our study seemed to be specific for our research context and intervention. Specific relations and changes over time will be discussed.

The replicated significant relation between mastery-approach and deep learning means that students who strive for mastering knowledge and skills are, not surprisingly, positively related to deep learning as well. Both mastery orientations (i.e., approach and avoidance) in our experimental group appeared to be negatively related to surface learning; that is to say, independent of approach or avoidance motivation, students who learned with a mastery orientation in the experimental group shied away from surface learning. These results were also found in previous research such as Maehr and Zusho (2009) and Midgley, Kaplan, and Middleton (2001). The feedback provided in the experimental group, might have mediated the relation between mastery orientations and learning behavior. As the aim of the intervention was to increase mastery orientations and a concomitant deep learning, the effect of feedback on the relation between mastery orientations and surface learning is not investigated. However, this is interesting for further research. Within our control group, mastery-avoidance related positively to surface learning. An explanation might be that mastery-avoidance orientations led to both positive (i.e., deep learning) and negative (i.e., surface learning) outcomes because of the avoidance component and the mastery component, each leading to different outcomes (Maehr & Zusho, 2009). In other words, a mastery orientation is associated with deep learning, and an avoidance orientation might lead to surface learning, two opposing effects resulting from a mastery-avoidance orientation. Fryer and Elliot (2007) denote this effect as a mixed antecedent profile, grounded in a positive need (e.g., need for achievement), a negative need (e.g., fear of failure), or in both antecedents. Overall, the expected relation between mastery orientation and deep learning was found and is in line with previous research (Covington, 2000). However, the expected positive relation between performance orientation and surface learning was not found.

In terms of changeability it can be concluded that the mastery-approach and performance-approach and deep and surface learning changed over the course of time. Muis and Edwards (2009) found that mastery-approach displayed the most variation, followed by performance-approach, and performance-avoidance being the most stable over time. In our study, performance-approach scores increased most and in all groups. It is noteworthy that scores on performance-approach orientation significantly increased in both groups over time (i.e., within a teaching period of eight weeks). Students seemed to focus more on demonstrating competence and/or on outperforming their peers and therefore on meeting the assessment requirements. This increase in an orientation of performing might be a valuable combination with a

mastery orientation. There is some evidence that performance-approach goals may be valuable in conjunction with high mastery orientations (Bouffard, Boisvert, Vezeau, & Larouche, 1995; Pintrich, 2000). Senko et al. (2011) suggested that performance-approach oriented learners might be more aware of the teacher's agenda; that is, the specific knowledge topics and skills the teacher considers important and is likely to assess. This focus might help performance-approach oriented students pass the course, whereas mastery oriented students might be directed to the topics they themselves are most interested in. The learning environment, including the assessment procedures, might have directed students towards a performance approach. From this perspective, the significant association found between both a mastery-approach orientation, a performance-approach orientation and deep learning in the experimental condition is valuable. For international business students to be able to meet the requirements of the learning environment, but also to meet the demands of their future working environment this combination might be valuable. Specifically, in the experimental condition sustainable feedback might have contributed to the maintenance of the deep learning behavior, while it was lacking in the control condition where deep learning on the individual level decreased.

The contribution of the sustainable feedback intervention within the domain of international business

The aim of this study was to alter adopted goal orientations into a mastery-approach and surface learning into deep learning. The sustainable feedback intervention is, as far as we have found in published research, a relatively new approach within the domain of international business. The limited effect of the intervention might be caused by the way the learning environment was organized. It might be that the constructive alignment within the learning environment worked against the intended effect; it should be noted that the intervention was solely implemented within the PBL group work. Besides this, four supportive lecture-based courses were part of the period and were assessed individually via examinations. These supportive lecture courses, the assessment forms (i.e., written and oral tests), and the work load at the end of the teaching period might have affected the students in choosing for an "economical" way of studying, meaning that students adjusted their learning behavior to the demands of the learning environment and specifically to the assessment structure. In other words, as the deadline nears, students chose an economical behavior such that requirements were met and were directed to a performance approach and surface learning (Senko et al., 2011)

Another explanation for the limited effects of the intervention might be that the domain of study (i.e., international business and the practical approach of the PBL assignments) and the preferred learning profile of the students limited the effect of the sustainable feedback intervention. It might be worthwhile to gain more knowledge on

the preferred learning profile of business students, in our study this was beyond our scope of research.

The intervention and the tutor group had a significantly negative effect on performance-approach. Previous findings show an effect of tutor behavior, as part of the total group, on learning processes and student achievement (Chng et al., 2011). The tutor behavior in the experimental groups was influenced by the specific instruction they had to follow to guide the sustainable feedback process within the groups. An explanation might be that their guidance directed the students away from a performance-approach. From previous research it is known that competitive environments and emotional corrective feedback directs students towards a performance-approach (Jiang, Song, Lee, and Bong, 2014). The intervention (i.e., sustainable feedback) and the tutor behavior prevented the students of a much stronger increase in performance-approach.

However, two promising results should give direction for future research on goal orientation, deep learning, and sustainable feedback. First, the students within the experimental condition maintained their initial deep learning. Second, the intervention negatively influenced the performance-approach of the students, meaning that without the sustainable feedback their performance-approach would have increased even more.

Overall, it can be concluded that sustainable feedback helped mastery oriented learners maintain their deep learning behavior, but it did not directly change the goal orientations. Students lacking sustainable feedback showed a decrease of deep learning on an individual level.

3.4.1 Methodological limitations and practical implications

A limitation of this study was that while it was a real-life learning situation, the length of the intervention period was limited. The aim of sustainable feedback was to make students think for themselves about what they wanted to learn and to be active in this learning process. In the day-to-day execution of the study program, the students and the tutors were not familiar with this approach. Only the tutors received training; students were not prepared in advance for this specific feedback method. Students should gain more prolonged experience on sustainable feedback to become more confident with this approach.

It has been taken into consideration that the operationalization of learning behavior differs among studies. Elliot and McGregor (2001) used the students' study strategy questionnaire (1999), in which the learning behavior is operationalized in deep processing, surface processing, and disorganization. Deviating results among studies might be attributed to these differing operationalizations of learning behaviors.

The feedback intervention was executed within the PBL groups, but this educational approach cannot be seen as an isolated approach in the entire learning environment. Besides the PBL group work, this environment is composed of supporting courses and

differential forms of assessment. The perception of students and tutors might influence the adopted goal orientations and learning behavior. The students' and tutors' perceptions of the learning environment should be investigated in future research to provide additional insights into the reported goal orientations and learning approach.

Sustainable feedback seems to be a promising approach within the context of international business education and problem-based learning. However, more research is needed on the learning profile of international business students, because the initial learning profile of students seems to be of influence on the results gained in this intervention study (e.g., the pre-test performance-approach positively influenced the post-test performance-approach). Along with the learning profile the learning environment - in terms of assessment forms and guidance by tutors - should be fully aligned with the sustainable feedback and the - from an educational point of view - preferred mastery orientation and concomitant deep learning.

Sustainable feedback as a tool to enhance mastery orientations and deep learning seems to be promising if more aligned with the learning environment and the accompanying perceptions of both students and tutors. Overall, it can be concluded that sustainable feedback helped students to maintain their deep learning.

4

Are Marketing Students in Control in Problem-based Learning?

This chapter is based on:
Geitz, G., Joosten-ten Brinke, D., & Kirschner, P. A. (2015). *Are marketing students in control in problem-based learning?* Manuscript submitted for publication.

ABSTRACT

This study investigated to what extent self-efficacy, learning behavior, and performance outcomes relate to each other and how they can be positively influenced by students asking for and seeking feedback within a problem-based learning environment in order to meet today's requirements of marketing graduates. An experimental pre-test - post-test non-equivalent group design intervention study was carried out with first-year marketing students.

The predicted relation between self-efficacy, learning behavior, and performance outcomes was confirmed. Self-efficacy has been found to positively influence performance outcomes, whereas surface learning has been found to negatively influence performance outcomes. Regression analysis showed that self-efficacy was a significant predictor of deep learning. Significant increases of self-efficacy and surface learning were found in the group as a whole and in the control group. In the experimental group, deep learning was maintained on an individual level. All participants perceived sustainable feedback in a positive way, however more time is needed to support the necessary evolving role of all participants

Critical thinking, problem solving, linking concepts, transfer of knowledge, and metacognitive skills are all essential skills for today's marketing student. To educate students properly in these skills, it is important that influencing variables, like self-efficacy and deep learning, are taken into account. Constructivist learning environments such as problem-based learning (PBL) can contribute to enhance self-efficacy and a concomitant deep learning behavior if objectives, teaching and learning, and assessment are properly aligned.

4.1 INTRODUCTION

Contemporary society and with this the future working environment of marketing students in higher education is continuously changing and requires corresponding learning outcomes (Nijhuis, Segers, & Gijselaers, 2005). A marketing practioner that can meet today's requirements must be able to act on the micro level of the customer, on the meso level of value constellation, and on the macro level of society (Webster & Lusch, 2013). This means that a marketing practioner must be able to switch from one level to another and understand the reciprocal relations between these levels. Both knowledge construction and the ability to transfer this constructed knowledge to rapidly changing real-life contexts have become crucial elements of learning environments in higher education (Alt, 2015). Constructivist learning environments might contribute to these changing demands because of the distinguishing feature of constructing knowledge through meaningful and complex problem solving in real-life situations (De Kock, Sleegers, & Voeten, 2004). The intended learning outcomes are reflected in the academic performance outcomes that marketing students achieve. Students' beliefs in their capabilities (i.e., self-efficacy), have been found to be a strong predictor of academic performance outcomes (Zimmerman, 2000). Furthermore, their performance is influenced by their learning behavior. This behavior varies from student to student (Fennolar, Román, & Cuestas, 2007), and thus requires a learning environment in which individual self-efficacy and learning behavior are steered to positively influence performance (e.g., learning) outcomes. This study investigates to what extent self-efficacy, learning behavior, and performance outcomes relate to each other in first-year marketing students and how they can be positively influenced within a problem-based learning environment.

4.1.1 Self-efficacy and learning behavior

Self-efficacy is a person's belief in her/his capabilities to execute behavior that is required to achieve prospective outcomes (Bandura, 1977). Feelings of student self-efficacy are related to students' belief that they themselves can influence outcomes through their own behaviors (Bandura, 1989). In education, this is important because students with high self-efficacy achieve high performance outcomes and display a deep learning behavior. Besides, they show intrinsic motivation and persistence in the face of failure, have strong outcome expectations, and attribute success or failure to effort, (Bandura, 2012; Bureau of Labor Statistics, 2014; Obilo & Alford, 2015; Usher & Pajares, 2008; Van Dinther, Dochy, & Segers, 2011; Zimmerman, 2000). Bandura (1977) indicated that self-efficacy influences the choices people make, the way they act, the amount of effort they exert, and their persistence. However, perceived self-efficacy is not a general trait; it can vary for a person across domains and contexts. Someone can have high self-efficacy beliefs in one domain or situation and low self-efficacy beliefs in

another. Even though it is known that self-efficacy can vary across domains and contexts, it is not clear whether it can be changed during a course (Fan, Meng, Billings, Litchfeld, & Kaplan, 2008). Because of this, it is worthwhile to gain specific knowledge on how to enhance students' self-efficacy in different contexts and among different student groups. In other words, this study investigates whether self-efficacy changes over time during the execution of a substantial task within a marketing program.

In addition to self-efficacy, students' learning behavior such as whether they learn at a deep or a surface level, is an important factor that influences their performance outcomes (Marton & Säljö, 1979). Deep learning is characterized by learning processes used to more fully understand the content and the message of an author, including searching for meaning and thinking critically. Surface learning is characterized by processes used for reproduction or memorization of the text and does not include any search for the meaning of the learning task. To meet the requirements of today's society and working environment whereby students are able to gain knowledge and transfer it to new novel situations, a deep learning approach is required during their studies. Changing technological business environments and therewith evolving business needs, requires marketing students well prepared and educated to be successful as marketing practioners (Wymbs, 2011). To this end, a positive relation has been found between self-efficacy and deep learning (Bandura, 1993; Fennolar et al., 2007; Greene & Miller, 1996; Liem, Lau, & Nie, 2008; Phan, 2010), while a negative relation has been found between self-efficacy and surface learning (Fennolar et al., 2007; Papinczak, Young, Groves, & Haynes, 2008). Self-efficacious students are willing to choose difficult and challenging tasks and to expend a lot of effort (Bandura, 1997). According to Bandura (1993), students who doubt their own capabilities may avoid deep learning because they do not feel competent to meet the expected difficulties. In contrast, some research has found that feelings of self-efficacy may be positively related to surface learning (Phan, 2010). This suggests that self-efficacious students might adopt surface learning behavior if this strategy is better suited to their needs, such as achieving high outcomes. Although the relation between learning behavior and performance outcomes is inconclusive in previous research, in general it seems that deep learning is associated with higher performance outcomes and surface learning with lower performance outcomes (Gijbels, Van de Watering, Dochy, & Van den Bossche, 2005). Bandura (1997) presumed that self-efficacy beliefs originate from four sources of information. The first and most powerful source is mastery experience, which is the experience of succeeding. Mastery experience provides people with information about their capabilities based on evaluation and reflection on the results obtained. A second source is vicarious experience, which includes observing others. Vicarious experiences can alter efficacy beliefs through comparison with others. Verbal persuasion is the third source of information provided by others to encourage a person to develop certain capabilities. Verbal persuasion is persuasive information provided by knowledgeable and reliable people. The fourth and final source is a person's physiological and

emotional state. If a person is tense, learning becomes more difficult. To support students in their self-efficacy development, elements of the learning environment should be aligned with the information acquired from these sources. Previous research is not yet univocal regarding which source of information is most relevant for enhancing students' perceived self-efficacy (Van Dinther et al., 2011). Because of the positive relation between self-efficacy, and deep learning and performance outcomes, it is important for educators to know how to positively influence their students' self-efficacy to obtain deep learning and high performance outcomes. Therefore, we investigate how these concepts relate, and how they change over time during the execution a substantial task.

Overall, the relations between self-efficacy, learning behavior, and performance outcomes, found in previous research are shown in Figure 4.1.

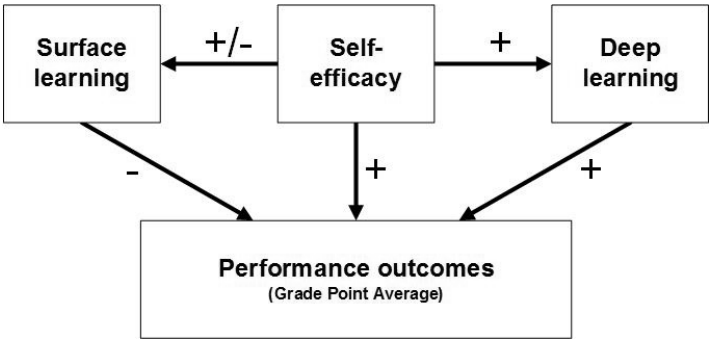

Figure 4.1. Relations between self-efficacy, learning behavior, and performance outcomes

4.1.2 Development of self-efficacy and deep learning in problem-based learning environments

Problem-based learning (PBL) is an instructional approach designed to enhance deep learning in which collaborative group work is used (Barrows, 1996; Papinczak et al., 2008). Some of the key elements of PBL are: it employs ill-structured problems to encourage students to think of the cause of the problem and how to solve it; it uses a student-centered approach where students have to determine what to learn; and it employs tutors who facilitate and stimulate students to ask themselves questions (Barrows, 2010). It is worth asking how a PBL environment might contribute to enhance self-efficacy and the concomitant deep learning behavior.

Alt (2015) examined the presumed effects of the constructivist dimensions of a PBL environment on self-efficacy. The constructivist dimensions were measured using the Constructivist Practices in the Learning Environment questionnaire (Tenenbaum, Naidu, Jegede, & Austin, 2001). She found that the dimensions motivation towards reflection

and concept investigation were the strongest predictors of self-efficacy regarding the PBL environment. She concluded that reflection on knowledge construction and learning capabilities within a PBL environment could develop a strong sense of self-efficacy, because these reflections contribute to a student's mastery experience. She also found that sharing ideas with others was the second strongest predictor of self-efficacy. Sharing ideas with others and social interaction can be stimulated via collaborative group work which provides students the opportunity to gain vicarious experience by observing the group members. In addition to the opportunity to gain vicarious experience, collaborative group work is aimed at stimulating students to engage in the learning material, develop critical thinking, and apply a deep learning approach. This is due to the assumption that students discuss and explore new ideas together, relate concepts to each other, and are encouraged to learn deeper (Fontenot, Schwartz, Goings, & Johnson, 2012; Johnston, James, Lye, & McDonald, 2000). The effectiveness of collaborative group work in terms of learning approaches and acquisition of knowledge has been investigated extensively with mixed findings. Hall, Ramsay, and Raven (2004) found a significant increase of deep learning after the implementation of group work with unstructured problem-solving exercises among accountancy students. Papinczak et al. (2008) found significant relations between high self-efficacy and a deep learning approach and low self-efficacy and a surface approach to learning among first-year medical students in a collaborative group work environment. Strobel and Van Barneveld (2009) conducted a meta-synthesis of meta-analyses in order to compare PBL with conventional classrooms and reported positive long-term retention of knowledge within PBL environments. Nijhuis et al. (2005) reported a decrease of deep learning after implementing a PBL course and attributed the disappointing results to aspects such as the alignment of the assessment and tutor behavior. In sum, the way in which the intended effects of enhancing self-efficacy and deep learning are achieved are not fully clear.

4.1.3 Feedback as an instrument to enhance self-efficacy and deep learning

Feedback has been found to have a considerable effect on learning; Hattie (2013) reported an overall effect size of 0.75. The sources of information from which learners derive their feelings of self-efficacy provide directions to adjust elements of the learning environment to enhance self-efficacy. Feedback could be tailored to these information sources and therefore directed to enhance self-efficacy. To positively stimulate self-efficacy, Fennolar et al. (2007) suggest feedback should be accurate to help students obtain a realistic view of themselves. They also recommend that feedback should be specific and tailored to the task. This information can support a student's mastery experience. Development of self-efficacy can also be steered by exposing students to appropriate role models and to positive feedback (Phan, 2010). These role models contribute to a student's vicarious experience and provide information through verbal

persuasion. Bandura (1977) pointed out that when people experience the gradual development of their abilities, their self-efficacy will increase. The support in the form of feedback given by educators during this process should be diminished when students become more and more experienced. In other words, the feedback should be directed toward the development of capabilities and the progress that is achieved. Based on the findings of Bandura (1997), Fennolar et al. (2003), and Phan (2010) it can be presumed that feedback might be an appropriate instrument to enhance students' feelings of self-efficacy. In addition, Boud and Molloy (2103) state that to be as effective as possible, feedback should be sought and asked for by students instead of tutors or lecturers giving the feedback without prior solicitation. The assumption is that self-efficacy in PBL and therewith deep learning is enhanced if students themselves are in control of their own feedback process by formulating their own feedback questions and seeking feedback from their peers and tutor. To sum up, the assumptions of effective feedback are that it should be directed toward developing capabilities while working on tasks, and students should play an active role by seeking feedback. In this study, we investigate these assumptions by asking and answering the research question: What are the effects of asking for and seeking feedback from peers and tutors on self-efficacy and learning behavior of first-year marketing students in PBL groups?

This main question is divided into the following sub-questions, and hypotheses.

RQ1. What is the relation between self-efficacy, learning behavior, and performance outcomes?

H1. Self-efficacy and learning behavior predict performance outcomes (measured in grades point average).

RQ1A. What is the relation between self-efficacy and learning behavior?

H2. Students showing high self-efficacy also show a deep learning behavior, students showing low self-efficacy also show a surface learning behavior.

RQ1B. Do self-efficacy and learning behavior change over time during the execution of a substantial task, and if so, in what direction?

H3. Self-efficacy and learning behavior are subject of change over time

RQ2. What are the effects of asking for and seeking feedback from peers and tutors on self-efficacy and learning behavior?

H4. If students ask and seek for feedback from peers and tutors, self-efficacy and deep learning will increase.

In Figure 4.2, all relations between self-efficacy, learning behavior, performance outcomes, and sustainable feedback. A distinction is made between relations that will be replicated and new hypothesized relations.

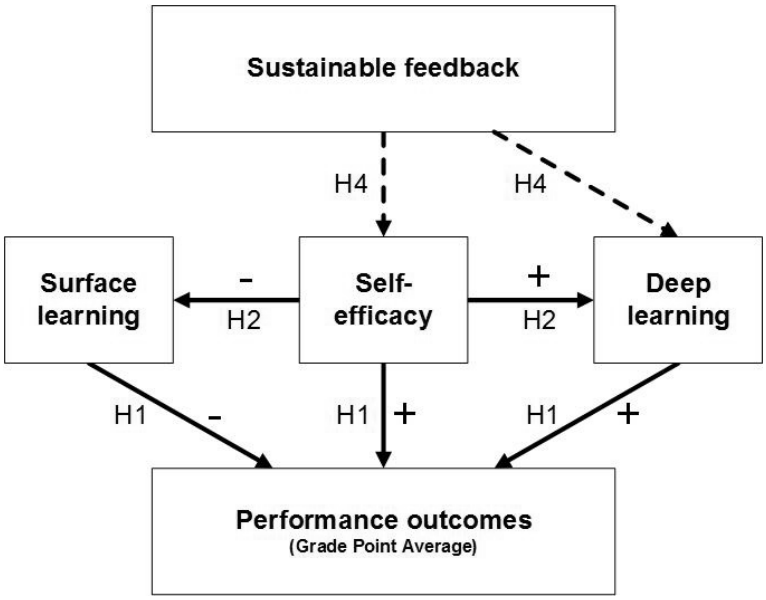

Figure 4.2. Hypothesized relations between self-efficacy, learning behavior, and performance outcomes;

meaning hypothesized relations to be replicated (H1, H2)

meaning new hypothesized relation (H4) (i.e. research question)

4.2 METHOD

4.2.1 Context

This experiment was conducted in the context of first-year Dutch higher education in the domain of marketing. The academic year is divided in four periods of eight weeks and the experiment was carried out in the third period of the first year. The marketing students work together in problem-based learning (PBL) groups solving marketing problems, they meet twice a week. The learning environment is composed of group work and individual work. The scheduled work load in the third period is 15 European Credits (EC; 1 EC=28.35 hours of study), of which 3 ECs are for PBL group work and 4 x 3 EC are for courses on subjects related to a practical problem. The subjects of these four courses were: business, commerce, communication, and modern foreign languages. These courses were taught and individually assessed on higher order learning objectives by content experts on written and oral tests. The PBL group work was guided by a tutor and consisted of analyzing and solving a marketing problem. Assessment of the PBL group work took place on group level: the assignment consisted of a marketing report, presentation, and defense and was assessed by a content expert.

The resulting group mark was individually adjusted based on the evaluation of active participation and attendance of the PBL sessions, given by the tutor. All assessments were scheduled after the end of the eight-week period and were expressed in figures from 1 to 10. Overall, the PBL group work, the four courses, and the assessments are a coherent program.

4.2.2 Participants

Participants were first-year students in marketing. The group consists of 105 first-year students (N = 105, 54 male, 51 female; M_{age} = 20.29; SD = 2.37; range: 17–30 year). Students were divided into 12 tutor groups, with seven tutors in total. An overview of tutors, groups, and conditions is given in Table 4.1.

Table 4.1. The distribution of tutor group over tutors and experimental and control condition

Tutor	Experimental condition	Control condition
1	Groups 7 and 8	
2	Groups 3 and 4	
3	Groups 1 and 2	
4		Groups 5 and 6
5	Groups 9 and 10	
6		Group 12
7		Group 11

4.2.3 Design

To investigate the effect of asking and seeking feedback on self-efficacy, learning behavior, and performance, an experimental pre-test-post-test non-equivalent group design intervention study (Experimental: N = 62; Control group: N = 43) was carried out. Existing tutor groups were randomly assigned to the conditions, taking into account that all groups of a specific tutor were in the same condition (see Table 4.1). As a consequence, the number of students in the conditions is not equal. In Table 4.2 it is indicated which variables are tested in relation to the hypotheses.

Table 4.2. Hypotheses and dependent and independent variables

Hypothesis	Independent variable	Dependent variable
1	Self-efficacy Learning behavior	Performance outcomes (grades)
2	Self-efficacy	Learning behavior
3		Self-efficacy Learning behavior
4	Feedback	Self-efficacy Learning behavior

4.2.4 Instruments

Two questionnaires were used, both of which were used and validated in previous research among undergraduate students.

- Self-efficacy was measured using the translated Self- and Task-Perception Questionnaire (STPQ-scale) (Van Meeuwen, Brand-Gruwel, Kirschner, De Bock, & Van Merriënboer, 2012), which is a 20-item, 5-point Likert scale.
- Learning behavior (i.e., deep and surface learning) was measured using a validated translated version of the Revised Study Process Questionnaire (R-SPQ-2F) (Biggs, Kember, & Leung, 2001), which is a 20-item, 5-point Likert scale.

Performance outcomes of the PBL group work and the four courses were collected per student from the back office of the program.

4.2.5 Procedure

The procedure is presented in Table 4.3.

Table 4.3. The procedure in both conditions

	Procedure experimental condition	**Procedure control condition**
Week 0	Tutors of the experimental PBL groups were given instructions on feedback.	
Week 1 1st meeting	Students filled out questionnaires measuring self-efficacy and learning behavior. Students received a bundle of feedback forms. Students wrote down individual learning points based on their experience in PBL groups in periods 1 and 2. Learning points were formulated as a question and related to aspects of collaboration in PBL groups.	Students filled out questionnaires measuring self-efficacy and learning behavior. Students received a feedback form. Students wrote down individual learning points based on their experience in PBL groups in periods 1 and 2. Learning points were formulated as a question and related to aspects of collaboration in PBL groups.

	Procedure experimental condition	Procedure control condition
		Tutors checked completeness and students kept the formulated learning points for themselves.
Week 1 2nd meeting	All group members shared their feedback questions with their peers and tutor. Everyone was in possession of all the feedback questions.	PBL activities and cooperation according to normal procedure.
Weeks 2, 3, 4	The tutor stimulated and guided the students to seek feedback on their own feedback questions. All students wrote down their own judgments (evaluation) of their performance on the specific learning points (i.e., feedback questions). At the end of every meeting, the students had to write down the feedback they sought and the feedback message they received.	PBL activities and cooperation according to normal procedure.
Week 4 2nd meeting	An evaluative moment in which all students had to compare their own judgements with the external judgments. If a student was satisfied with the feedback, then it was possible to rephrase the feedback questions to be able to ask and seek feedback for other learning points from that point on.	PBL activities and cooperation according to normal procedure.
Week 5 1st meeting	All (rephrased) feedback questions were shared amongst the students.	PBL activities and cooperation according to normal procedure.
Weeks 5, 6, 7, 8	The tutor stimulated and guided the students to seek feedback on their own feedback questions. Students wrote down their own judgments (evaluation) of their performance on the specific learning points (i.e., feedback questions). At the end of every meeting, the students had to write down the feedback they sought and the feedback message they received.	PBL activities and cooperation according to normal procedure.
Week 8 2nd meeting	The feedback questions were evaluated within the PBL group. Students filled out the questionnaires on self-efficacy and learning behavior. There were no formal (summative) judgments of the feedback process.	Students filled out the questionnaires on self-efficacy and learning behavior. Afterwards, the learning points formulated during week 1 were evaluated.
Week 9	Submission and presentation of PBL assignment and examination of the supporting courses (written tests).	Submission and presentation of PBL assignment and examination of the supporting courses (written tests).

4.2.6 Data analysis

Descriptive and preliminary analysis was conducted to summarize and assess the data. To test whether self-efficacy and learning behavior were comparable among the experimental and control conditions at the start of the experiment, an independent *t*-test was conducted. To check differences between tutor groups at pre-test, a one-way ANOVA Bonferroni post hoc analysis was conducted. The relation between self-efficacy, learning behavior, and performance outcomes was investigated with a multiple regression analysis (RQ1) and correlation analysis (RQ1A). Performance outcomes (i.e., the grade point average) were based on the individual mark on the PBL assignment and the marks on the written and/or oral tests. It was expected that the individual mark on the PBL assignment as such was not a representative measurement and calculation of the performance outcomes as a whole. To confirm these relations and test whether self-efficacy predicts deep learning, a linear regression analysis was used to test the predictive effect of self-efficacy on deep learning (RQ1A). Changes over time were tested by conducting a paired sample *t*-test and the reliable change index (RCI) (Zahra & Hedge, 2010) (RQ1B). The effect of the intervention was tested with a multiple regression analysis (RQ2).

4.3 RESULTS

The reliability of the scales was calculated with Cronbach's alpha at pre-test and post-test.

The Cronbach alphas are sufficient to good and comparable to previous findings (see Table 4.4).

Table 4.4. Cronbach's alpha at pre- and post-test

Measurement		Pre-test	Post-test	Items
Self-Efficacy		.774	.797	19
Learning Behavior	Deep Approach	.793	.832	2
	Surface Approach	.684	.764	2

Preliminary analyses showed significant differences between both conditions in self-efficacy (t = -2.770; df = 102, p < .05) and deep learning behavior (t = -2.058; df = 101, p < .05).

One-way ANOVA showed significant differences between tutor groups in self-efficacy at pre-test ($F(6, 97) = 4.295$, p = .001). Additional Bonferroni post hoc analysis showed a significant lower mean score for n tutor group 1 (M = 3.29; SD = .491) compared to tutor group 2 (M = 3.74 SD = .239; p = .007), tutor group 3 (M = 3.73

SD = .277; p = .008), and tutor group 4 (M = 3.70 SD = .225; p = .017). These differences are taken into account in further analyses.

Means and standard deviations are presented in Table 4.5.

Table 4.5. Means and standard deviations at pre-test and post-test for the control, experimental, and total group

	Control		Experimental		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
Self-Efficacy Pre-test	3.48	.38	3.67	.31	3.59	.35
Self-Efficacy Post-test	3.61	.36	3.71	.36	3.67	.36
Deep Learning Pre-test	2.72	.49	2.97	.67	2.87	.61
Deep Learning Post-test	2.70	.57	3.00	.59	2.88	.60
Surface Learning Pre-test	2.57	.44	2.73	.62	2.67	.56
Surface Learning Post-test	2.75	.58	2.81	.61	2.79	.60
Grade Point Average Incl PBL Grade*	5.97	1.23	6.20	1.12	6.10	1.17

*scale 1 to 10.

RQ1 What is the relation between self-efficacy, learning behavior, and performance outcomes?

In Table 4.6 the results of a multiple regression analysis are presented. Performance outcomes were predicted by self-efficacy and surface learning, $F(2, 98) = 8.035$, p = .001, R^2 = .141. In other words, high self-efficacy is associated with higher grades and surface learning is associated with lower grades. Performance outcomes were not significantly predicted by deep learning. Multiple regression analysis based on only the PBL assignment mark did not show any significant results.

Table 4.6. Multiple regression self-efficacy, surface learning, and performance outcomes (i.e., GPA) for the total group

						95% Confidence Interval for B	
	B	SE	Standardized Beta	*t*	Sig.	Lower Bound	Upper Bound
(Constant)	5.122	1.343		3.815	.000	2.457	7.786
SE-2	.687	.311	.210	2.206	.030	.069	1.305
SL-2	-.554	.189	-.278	-2.928	.004	-.929	-.178

Dependent variable: GPA

Note. SE-2 = Self-efficacy, post-test; SL-2 = Surface learning, post-test.

RQ1A What is the relation between self-efficacy and learning behavior?

As presented in Table 4.7, at both pre-test and post-test, deep learning and self-efficacy relate significantly positive to each other. These significant positive correlations also occur between pre-test and post-test.

Table 4.7. Correlation matrix for the variables Deep learning, Surface learning, Self-efficacy, at pre-test and post-test

Variable	1	2	3	4	5	6
1. Deep Learning pre-test		-.19	.34**	.67**	-.22*	.44**
2. Surface Learning pre-test			-.13	-.15	.67**	-.19
3. Self-efficacy pre-test				.45**	-08	.50**
4. Deep Learning post-test					-.12	.58**
5. Surface Learning post-test						-.17
6. Self-efficacy post-test						

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

The correlation analysis is complemented with a linear regression analysis to investigate whether self-efficacy is a predictor of learning behavior. Deep learning is predicted by self-efficacy at pre-test and post-test ($F(2, 100) = 29.319$, $p < .0005$, $R^2 = .370$). Beta-weights and their associated *t*-values are presented in Table 4.8. In other words, self-efficacy significantly predicts deep learning.

Table 4.8. Regression self-efficacy predictor of deep learning at pre-test and post-test

				95% Confidence Interval for B	
	B	*t*	Sig.	Lower Bound	Upper Bound
(Constant)	-1.313	-2.328	.022	-2.432	-.194
SE-1	.360	2.282	.025	.047	.672
SE-2	.790	5.191	.000	.488	1.092

Dependent Variable: Deep Learning
Note. SE-1=Self-efficacy, pre-test; SE-2=Self-efficacy, post-test.

RQ1B Do self-efficacy and learning behavior change over time during the execution of a substantial task, and if so, in what direction?

Paired sample *t*-tests were conducted to investigate whether students' self-efficacy and learning behavior changed during the course in the group as a whole and in both the experimental and control group. In the group *as a whole,* there was a significant increase between self-efficacy score at pre-test and post-test of .081, $p = .022$, Cohen's d = .23. A significant increase in surface learning was found between pre-test and post-

test of .134, p = .005, Cohen's d = .29. In the *control* group, a significant increase in the self-efficacy score was found between pre-test and post-test of .143, p = .018, Cohen's d = .38; a significant increase in surface learning was also found, .190, p = .019, Cohen's d = .38.

Mean-level analysis is complemented with an analysis at an individual level (i.e., reliable change index (RCI); Zahra, 2010). In Table 4.9 the RCI for the group as a whole, and for the experimental and control group are presented. In the group *as a whole*, more students showed an increasing self-efficacy than a decreasing self-efficacy (an increase of 22.1% and a decrease of 8.7%); more students showed a decreasing deep learning behavior than an increasing deep learning behavior (an increase of 17.5% and a decrease of 21%); and more students showed an increasing surface learning behavior than a decreasing surface learning behavior (an increase of 28.8% and a decrease of 14.4%).

In the *experimental group,* more students exhibited an increase in self-efficacy (an increase of 14.5% and a decrease of 9.7%); deep learning remained stable. In terms of surface learning, there was a pattern of significant increase among students (an increase of 27.4% and a decrease of 16.1%). In other words, students while maintaining their deep learning behavior also reported an increase in surface learning.

In the *control group,* self-efficacy showed a similar pattern of increase (an increase of 33.3% and a decrease of 7.1%). On an individual level, more significant changes were found: more students decreased in deep learning (a decrease of 21.4% and an increase of 14.3%), whereas more students increased in surface learning (an increase of 31% and a decrease of 11.9%). In other words, students who did not receive the feedback intervention decreased in their deep learning behavior and reported the largest increase in surface learning.

Table 4.9. Overview of individual significant changes according to the reliable change index on self-efficacy and learning behavior, change in %

	Total of all groups		*Experimental group*		*Control group*	
	↓	↑	↓	↑	↓	↑
Self-efficacy	8.7	22.1	9.7	14.5	7.1	33.3
Deep learning	21.4	17.5	0	1.6	21.4	14.3
Surface learning	14.4	28.8	16.1	27.4	11.9	31.0

Note. ↓ = significant % decrease; ↑ = significant % increase.

RQ2 What are the effects of asking and seeking feedback from peers and tutors on self-efficacy and learning behavior?

Multiple regression analyses did not show any significant effects of the intervention on self-efficacy and learning behavior.

4.4 CONCLUSION AND DISCUSSION

The hypothesized relation between self-efficacy, learning behavior, and performance outcomes was found (H1). Self-efficacy was found to positively influence performance outcomes, whereas surface learning has been found to negatively influence performance outcomes. Within this predicted relationship it was expected that students reporting high self-efficacy would also show a deep learning behavior (H2). This relationship was found at both pre-test and post-test. Regression analysis showed that self-efficacy is a significant predictor of deep learning. The presumed changeability of both self-efficacy and learning behavior was also supported in this study (H3). Significant increases of self-efficacy and surface learning were found in the group as a whole and in the control group. However, on an individual level the reliable change index provided additional insights in terms of deep learning. More students decreased than increased in terms of deep learning in the control group; in the experimental group almost all students remained stable in their deep learning approach. Overall, it is noticeable that at least 55% of all students did not report any change in self-efficacy and learning behavior. The expected positive influence of sustainable feedback on both self-efficacy and learning behavior was not directly found (H4).

In light of the results obtained in this study, all hypothesized relations and changes over time were found. For a considerable part of the student population, self-efficacy and learning behavior changed. However, a direct effect of the feedback intervention in terms of increasing self-efficacy and deep learning was not observed; instead, deep learning behavior was maintained in most of the students. Overall, the relevance of intending to influence self-efficacy and learning behavior in order to increase performance outcomes has been shown. The possible causes and implications of the results are discussed in the following sub-paragraphs.

Self-efficacy, learning behavior, and feedback

The aim for enhancing self-efficacy and the concomitant deep learning behavior is in line with the evolving requirements in the working field of marketing practioners. Critical thinking, problem solving, linking concepts, and metacognitive skills are all essential skills for today's marketing student. Some students in the experimental condition reported an increase of self-efficacy, but not as much as was aimed for. The – for the students - new experience of having to ask for and seek feedback might have muted the intended increase during this study. Mastery experience was found to be the strongest information source from which students derive their feelings of self-efficacy (Usher & Pajares, 2008); being immersed in this new feedback situation, students could not reflect on their previous experiences. Continuation of this approach might give students the opportunity to gain experience in asking for and seeking feedback, evaluating and reflecting, and thereafter adjusting their feelings of self-efficacy. As Hattie and Timperley (2007) state, for feedback to be effective three questions are

important: Where am I going? How am I going? and Where to next? Explicit attention to these mechanisms for feed up, feed back, and feed forward provides valuable information about the students' goals and progress, including how to better support this process of gaining mastery experience.

The feedback intervention was aimed at enhancing self-efficacy and in doing so increasing deep learning. The intervention was directed at the sources of information from which students derive their self-efficacy. Mastery experience was made explicit by formulating and asking questions about two specific individual aspects; for example, collaboration with peers, chairing a meeting, and presenting. This approach helped students gain a realistic view of themselves, tailored to a specific task (Fennolar et al., 2007). Peers and tutors were specifically asked to comment on these individual questions in order to add verbal persuasion, and through the collaboration they had the opportunity to gain vicarious experience (Phan, 2010). Self-evaluation was part of the procedure to help students to evaluate and reflect as part of the feedback cycle (Shute, 2008). In the experimental groups students were able to maintain their deep learning approach, but their self-efficacy increased only modestly. One initial explanation might be that students need more time to gain more mastery experience related to asking for and seeking feedback in order to further increase their self-efficacy. Another explanation might be the students' perception of the somewhat 'hybrid' learning environment composed of PBL group work/assessment and individual courses/ assessment. In the first two periods of year 1 they might have experienced that a deep approach was not necessary to pass the exams. This, in turn, might have caused the increase of self-efficacy and surface learning to be modest. The results of our study in terms of the changeability of self-efficacy and learning behavior are mixed: on the one hand significant changes were found, but on the other hand more than half of the students did not report significant changes.

Performance outcomes

In line with previous research, self-efficacy proved to be a positive predictor of performance outcomes and that surface learning is a negative predictor (Fennolar et al., 2007; Zimmerman, 2000). The performance outcomes of the students in the experimental groups are slightly higher compared to the control condition, but these differences were not significant. On the mean level, surface learning increased significantly in the control group; on the individual level, there were more students with an increased surface learning behavior in the control group. An explanation for the lack of significant differences in performance outcomes between the control group and the experimental group might be that students perceived that a surface learning approach was 'enough' to be successful. The students in the experimental group who maintained their deep learning approach did not achieve significantly higher grades.

Constructivist learning environment

The constructivist learning environment in this study was a problem-based learning environment. The contribution of a PBL environment to self-efficacy and deep learning produced mixed results in previous research (Hall et al., 2004; Nijhuis et al., 2005; Papinczak et al., 2008; Strobel & Van Barneveld, 2009). The PBL environment in this study was characterized by both group and individual work; students had to prepare for both group and individual assignments. Nijhuis et al. (2005) reported an increase of surface learning in PBL groups and related this to lower scores on appropriate workload and appropriate assessment. The marketing students in this study might have perceived the workload and assessment as not adequately aligned with the PBL environment. As Biggs stated with respect to constructive alignment (1996), the objectives of learning, approach to teaching and learning, and assessment of the intended learning outcomes need to be properly aligned.

4.4.1 Methodological limitations and practical implications

A methodological limitation - and therefore a possible explanation for the limited effects of the intervention - might be that this research was conducted in a real-life setting, and thus not all variables could be controlled for. For example, tutors of the experimental condition were instructed as to how to implement the intervention and how to guide the students during this new feedback approach, but the actual tutor behavior could not be controlled (Nijhuis et al., 2005). Another resulting limitation of the real-life setting was the limited intervention period. Adjustment of feelings of self-efficacy and the concomitant deep learning behavior might require more time to gain mastery experience.

It can be concluded that the relation between self-efficacy and deep learning is important for marketing education due to the continuously changing requirements of the working field. Critical thinking, problem solving, linking concepts, transfer of knowledge, and metacognitive skills are all essential skills for today's marketing student. Constructivist learning environments such as PBL can contribute to enhancing self-efficacy and a concomitant deep learning behavior if objectives, teaching, learning, and assessment are properly aligned.

5

Sustainable Feedback: Students' and Tutors' Perceptions

This chapter is based on:
Geitz, G., Joosten-ten Brinke, & Kirschner, P. A. (2015). *Sustainable feedback: students' and tutors' perceptions.* Manuscript submitted for publication.

ABSTRACT

Feedback has been shown to substantially influence students' learning. However, not everything characterized as feedback is effective. Sustainable feedback places students in an active role in which they generate and use feedback from peers, self or others and aims at developing lifelong learning skills. First-year higher education students and tutors received sustainable feedback during their problem-based learning. To gain insights into how they perceived the sustainable feedback, students were probed via structured, open-ended questionnaires. While all participants positively valued the feedback, their personal characteristics, previous experience with feedback and concomitant perceptions appeared to have greatly influenced both tutors' and students' specific, individual behavior and responses. Conclusion is that sustainable feedback requires an evolving role of students and tutors with respect to sharing their perceptions of what feedback is, understanding the value and importance of feedback contributions of all participants, and developing the necessary skills to ask questions and give feedback.

5.1 INTRODUCTION

5.1.1 Sustainable feedback

While teachers in higher education spend much time and effort providing their students with feedback, the quality of this feedback can be improved (Arts, Jaspers, & Joosten-ten Brinke, in press). One way to do this, according to Boud and Molloy (2013), is to have the feedback be sought and asked for by students instead of having teachers give the feedback without prior solicitation. This type of feedback is known as sustainable feedback (Carless, 2006).

Hattie and Timperley (2007, p.81) define feedback as "information provided by an agent (e.g., teacher, peer, book, parent, self) regarding aspects of one's performance or understanding". This information should address the gap between what a person has mastered about a task, process, or their self-regulation and what is aimed or required to be mastered (Sadler, 1989). Feedback, as educational approach or intervention has been found to have a considerable positive effect on learning with Hattie (2013) reporting an overall effect size of 0.75. However, not everything that is characterized as feedback effectively leads to learning (Boud & Molloy, 2013). Traditionally, feedback is seen as a one-way activity initiated by the teacher (i.e., someone with more knowledgeable in a position of authority and power), who sends feedback messages to learners about the quality of their work with the objective of improving it. It can be questioned whether this approach to providing feedback contributes to what needs to be learned by students in higher education. Society and the students' future working environment are in continuous, fast-paced change which requires corresponding learning outcomes (Nijhuis, Segers, & Gijselaers, 2005). This dynamic needs to be reflected in the intended learning outcomes of higher education such that students are equipped to become self-initiating seekers and users of information necessary for ongoing learning throughout their working lifetime (Boud, 2000). Shifting feedback from something initiated by teachers to sustainable feedback where students ask for and actively seek feedback from peers and teachers, addresses these needs of today's society including the need for lifelong learning (Nicol & MacFarlane-Dick, 2006). Sustainable feedback is defined by Carless (2013, p.113) as "active student participation in dialogic activities in which students generate and use feedback from peers, self or others as part of an ongoing process of developing capacities as autonomous self-regulating learners". Students who have developed self-regulation skills, such as self-monitoring, self-reflection and goal-setting, demonstrate higher levels of achievement and motivation (Clark, 2012; Schunk, 1996). Students should and need to learn to be independent of their teachers, independently using these skills in different settings and in cooperation with others (Boud, 2000). To this end, several researchers make a plea for students taking/being given a more active role in the feedback process (see for

example Boud & Molloy, 2013; Sadler, 1998; Yorke, 2014). Only then, the effect of feedback on learning can be sustainable.

It is a continuous process because students have to judge their own work according to learning objectives, subsequently ask for feedback on both process and product, and compare their own internal judgments thereof with the external judgments of others. Based on this, students can generate a plan to take further steps in the direction of the achieving learning objectives and implement this plan in subsequent tasks (Boud & Molloy, 2013). This continuous process of feed up ('Where am I going?'), feed back ('How am I going?') and feed forward ('Where to next?') has a short term effect on the improvement of the execution of subsequent tasks and a long term effect on development of self-regulation skills (Hattie & Timperley, 2007; Nicol & MacFarlane-Dick, 2006). These three process steps contribute to the sustainability of feedback by giving students the opportunity to use the feedback for example by producing improved work. Only then can both students and teachers know whether learning has occurred (Boud, 2000). To fully interpret the feedback generated during this process, students need to give meaning to the feedback received (e.g., through discussions). This can be done by assessment dialogues in which students and teachers, and peers mutually discuss the feedback questions. In the assessment dialogue feedback has a crucial role in clarifying both the learning intentions and the criteria for success (Carless, 2006; Ruiz-Primo, 2011). Explicit discussions of learning intentions and success criteria allow students to react directly to the information given in an assessment dialogue and make explicit the tacit assumptions of the teacher in terms of assessment (Ruiz-Primo, 2011).

5.1.2 Feedback related to individual learner characteristics

Feedback regulates and is regulated by how students *feel about themselves*, and influences what and *how they learn* (Dweck, 2000). An aspect of how students *feel about themselves* is known as self-efficacy: one's belief in one's capabilities to execute behavior required to achieve prospective outcomes (Bandura, 1977). Bandura indicated that self-efficacy influences the choices people make, the way they act, the amount of effort they exert, and their persistence. Peoples' self-efficacy is, according to Bandura, derived from four information sources. First, *mastery experience* is the most powerful information source providing people with information about their capabilities. Second, *vicarious experience* provides information through comparison to others. The third information source is the *verbal and social persuasion* used by others for providing information meant to encourage a person to develop certain capabilities. Finally, a student's *physiological and emotional state* is a source of information on the experienced difficulty of learning. Feedback can contribute to the explicit evaluation of these information sources, for example by directing feedback at the task to support a student's mastery experience (Fennolar, Román, & Cuestas, 2007) or exposing students

to positive feedback and appropriate role models which uses both verbal persuasion and vicarious experience (Phan, 2010).

An aspect of *how students learn* is their goal orientation; that is their approach to learning. Different goal orientations can be distinguished. If one aims to obtain grades that are good enough to pass a test, then this is seen as performance orientation. When the goal is to become good or better at something, then this is seen as mastery orientation. In addition, some students are more oriented towards avoiding negative outcomes, while others wish to achieve a positive outcome. This leads to four types of goal orientation: mastery-avoidance, mastery-approach, performance-avoidance, and performance-approach (Elliot, 1999). From an educational point of view a mastery orientation is favored because of the willingness to master learning tasks. To guide students into the adoption of a mastery orientation the *ability* to develop skills and gain knowledge should be stressed (Hoska, 1993). Therefore feedback should be directed at the development of certain skills and the knowledge that should be obtained and the experience of increasing levels of competence.

5.1.3 The influence of feedback on self-efficacy and goal orientation

When feedback is only directed at and viewed as transmission of information from teachers to students, the interaction of feedback messages with self-efficacy and goal orientation is disregarded (Nicol & MacFarlane-Dick, 2006). In other words, feedback should not only be seen as a one-way cognitive information process about what is right or wrong and why, but should also be directed at students' beliefs and motivation. Feedback can interact with self-efficacy and goal orientation if it is directed at the evaluation of the four information sources and on increasing levels of competence.

Feedback has been found to affect both self-efficacy and goal orientation. Liem, Lau and Nie (2008) found that different forms of feedback led to different effects on self-efficacy; students who received feedback only on the correctness of what they had done decreased more in their self-efficacy than students who received feedback aimed at their thinking about or behavior on what they had done. Fennolar et al. (2007) posit that feedback should be contextual in that it should be specific to the task and the student's skills to influence self-efficacy. Such task specific feedback also supports the student's mastery experience. An influence of feedback on goal orientation was found by Winne, Muis, and Jamieson-Noel (2003). They found that positive feedback led to a decrease in performance-avoidance, and that negative feedback led to a decrease in performance-approach orientation. Interestingly, this relationship might be bidirectional, namely that negative feedback might increase performance-avoidance, and positive might increase performance-approach.

While feedback influences self-efficacy and goal orientation, self-efficacy and goal orientation, in turn, influence how feedback is understood and processed (Narciss et al., 2014). For example, performance-avoidance oriented students might understand

feedback as a prove of personal incompetence and might disregard and neglect the information processed. Evans (2013) stressed interest in investigating the relation between these concepts and the way feedback is used and interpreted because there is not a lot of empirical evidence yet about the influence of individual learner characteristics, such as self-efficacy and goal orientation on feedback processing.

5.1.4 Perceptions

However, individual learner characteristics are not the only influence on the way feedback is understood. The way feedback is perceived and understood might differ between students. The perceptions of students with respect to feedback depend on their frame of reference (i.e., their conceptions of what feedback is or should be) which is built on their previous experiences (Gulikers, Bastiaens, & Kirschner, 2006). For example, if your conception of good feedback is that the teacher provides the correct answer after you have given a wrong answer, then your perception of epistemic feedback (i.e., to ask for explanation and/or clarification, Guasch, Espasa, Alvarez, & Kirschner, 2013) asking the learner to think about why or how your answer could be different will probably be perceived as bad feedback and/or not helpful. Kember, Jenkins, and Ng (2003) found that students' perceptions of the quality of teaching (e.g., feedback received from teachers) are influenced by their conceptions of learning. This implies that to better understand why and how students act on or respond to feedback, it is important to take their conceptions of both feedback and learning into account. Or as Black and Wiliam (2009, p. 26) phrased it: "the teacher's agenda, the internal world of each student, and the intersubjective" are the relationships to investigate in order to better understand how feedback is used, acted on or responded to. To understand how students act, Adcroft (2011) studied feedback from a social-process perspective, stressing the central role of teachers and students as part of the feedback process. Adcroft found differences between students and teachers in the way they perceived the importance and usefulness of feedback. For example, students perceived written feedback as the most useful form of feedback critical to their learning experience. Their teachers, in contrast, valued written feedback significantly less. But it is not only the students' perceptions that are important. Research has shown that teachers' perceptions of teaching are reflected in the way they approached and carried out their teaching activities (Samuelowicz & Bain, 2001; Zhu, Valcke & Schellens, 2010). Both students' and teachers' perceptions of teaching and learning are reflected in the way they approach and carry out teaching and learning. While investigating these perceptions, it is important to note that not all students perceive feedback in a similar way; they do not hold a homogenous view of what effective feedback is (Evans, 2013). The ultimate aim of investigating these perceptions is that it can be used to help students recognize feedback as feedback and learn how to use it and to act on it (Poulos & Mahony, 2008).

5.1.5 Research question

This study addresses the following research question: How did both students and tutors perceive the use and value of sustainable feedback?

5.2 METHOD

5.2.1 Context

Sustainable feedback was organized in the context of a first-year Dutch higher education course in the marketing domain. The academic year was divided into 4 periods of 8 weeks, and the sustainable feedback was organized in the third period of the first year. The marketing students worked together in problem-based learning (PBL) groups, solving marketing problems. The learning environment was composed of group work and individual work. The scheduled workload was 15 European Credits (EC; 1 EC=28.35 study hours), of which 3 EC involved PBL group work and 12 EC (4 courses of 3 EC each) were in subjects related to the practical problem. The PBL group work was assessed on a group level with the possibility to deviate on an individual-level. The four subject-related courses were assessed with a written and/or oral exam and were all graded on an individual-level. Students received a bundle of feedback forms. As homework assignment students wrote down their individual learning-points (i.e., what they themselves would like to improve in terms of all aspects of their PBL work: from writing skills to chairing a meeting) based on their experience in PBL groups in the first two periods. Learning-points were formulated as a question and related to aspects of collaboration in PBL groups. During the next session members of each group shared their feedback questions with their peers in their PBL-group and the tutor. Everyone was in possession of all the feedback questions of the group. The tutor stimulated and guided the students to seek feedback for their questions. All students wrote down their own judgments (evaluation) of their performance on the specific learning points (i.e., feedback questions). At the end of every meeting, the students had to write down the feedback they had sought and the feedback messages they had received. Halfway through the eight-week period, students were given the opportunity to formulate one or two new feedback questions.

5.2.2 Participants

Participants in this study were 62 first-year Bachelor of Business Administration marketing students in the Netherlands (33 males, 29 females; M_{age}=20.35; *SD*=2.60; range: 17-26 years, 46 Dutch, 15 Germans, 1 Italian) enrolled in the first year of a 4-year marketing Bachelor of Business Administration program. They participated in a PBL

course that lasted for 8 weeks. Of these 62 participants, 8 students were selected at random and they participated voluntarily in this qualitative study (4 males, 4 females; M_{age}=21.5; *SD*=2.60; range: 17-26 years, 5 Dutch, 2 German, 1 Italian) and represented all tutor groups. All 4 tutors (2 males, 2 females; M_{age}=48.5) guiding these groups participated as well.

5.2.3 Instruments

A structured open-ended questionnaire for tutors (13 questions), and a structured open-ended questionnaire for students (22 questions) were used to gather qualitative information on perceptions of the sustainable feedback. The interview questions were composed of background questions and questions reflecting the theoretical framework on sustainable feedback and learner characteristics (see Table 5.1). Examples of student questions were:

- You have shared your feedback questions with your peers/group members. What did you think of that? How did that make you feel?
- How did you experience having to ask for feedback yourself? Did you experience a feeling of being in control?
- In many situations (also in PBL-groups) the feedback is often unsolicited. Could you explain what is more useful from your point of view: asking for feedback yourself or receiving unsolicited feedback? Why?
- How do you assess the feedback you received from your peers? Why? How do you assess the feedback you received from your tutor? Why?

Examples of tutor questions were:

- Did the students manage to ask for and seek feedback from day 1?
- Please indicate the main differences in terms of your guidance compared to previous periods?
- Please give some examples of the way in which the students asked for and sought feedback?

5.2.4 Procedure

After completing the eight-week period students were invited via email to participate in the interview, and all tutors received an invitation to participate as well. The interviews were held from week 9 on. The individual interviews were carried out by the institution's educational advisors who were familiar with the PBL approach. They followed a standardized open-ended structure in which the questions were asked in a

specific order and exactly as worded. The interviewers were allowed to ask supplementary questions for clarification or deepening of the answers. Students and tutors were invited to reflect on the previous period, keeping in mind the PBL group.

5.2.5 Data Analysis

The interviews were digitally recorded and transcribed verbatim. Coding was done using NVIVO® 10. The final coding protocol was achieved through a combination of applying the theoretical framework underlying the project and abductive reasoning which moves back and forth between induction and deduction (Morgan, 2007). It is a pragmatic approach using existing theoretical explanations to make inferences about data, explaining noteworthy patterns by modifying the existing theory. The aim of abductive reasoning is to find the best explanation for what is happening (Sinkovics & Alfoldi, 2012). Thus, based on our theoretical framework, an initial coding protocol was composed (see Table 5.1 for an overview of the theoretical underpinning of the feedback related to the protocol). After the first coding session, codes were modified or combined in case of overlap (see Appendix 1 for the coding scheme). The hierarchical structure of the coding consisted of parent nodes (i.e., all references according to a theme) and child nodes (i.e., more specific and detailed references belonging to a parent node). The results are reported per theme.

Table 5.1. Relation theoretical underpinning sustainable feedback with coding of the interview data (S = Student topics; T = Tutor topics)

Theoretical underpinning	Codebook
Boud and Molloy, 2013	
• Students judge their own work and are encouraged to articulate this judgement (self-evaluation)	• Self-evaluation (S)
• Students seek of solicit feedback on specific elements/steps (asking questions on certain aspects of their work).	• Asking for or receiving unsolicited feedback (S) Development in searching (T) Examples of searching (T)
• The tutor and peers provide performance information to the learner	• Interpretation of the feedback message (S)
• The learner, explicitly, compares the internal and external judgments and decide how to meaningfully interpret these messages	• Interpretation of the feedback message (S) Information for tutors (T) Personal development of students (T)
• The comparison of both judgments in relation to the standards are used to generate a plan for improved work	• Interpretation of the feedback message (S) Information for tutors (T) Personal development of students (T)
• The strategies are implemented in the subsequent participation in later tasks	• Interpretation of the feedback message (S)
Nicol and MacFarlane-Dick, 2006	
• Helps clarify what good performance is (goals, criteria, expected standards)	• Interpretation of the feedback message (S)
• Facilitates the development of self-assessment (reflection) in learning	• Self-evaluation (S)
• Delivers high quality information to students about their learning	• Quality of feedback: tutor and peers (S)
• Encourages teacher and peer dialogue around learning	• Part of the execution of the sustainable feedback
• Encourages positive motivational beliefs and self-esteem	• Aim of sustainable feedback
• Provides opportunities to close the gap between current and desired performance	• Interpretation of the feedback message (S)
• Provides information to teachers that can be used to help shape teaching	• Information for tutors (T) Difference sustainable feedback– as previous (T)
Hattie and Timperley, 2007	
• Feedback about the task	• Forms of feedback (S/T)
• Feedback about the processing of the task (powerful in terms of deep processing and mastery of the task)	• Forms of feedback (S/T)
• Feedback about self-regulation(powerful in terms of deep processing and mastery of the task)	• Forms of feedback (S/T)
• Feedback about the self as a person	• Forms of feedback (S/T)
Goal orientation – Hoska, 1993	
• Modifying the goal structure of the learning task – learning environment (cooperation)	• Part of the learning environment PBL

Theoretical underpinning	Codebook
• Controlling the delivery of learning rewards - Emphasis on developing skills and gaining knowledge stimulates focusing on the task and consequently fosters mastery goals	• Increasing levels of competence (S)
Self- Efficacy - Bandura, 1977	
• Feedback focused on increasing levels of competence and the process during the execution of a task will enhance learners' feelings of self-efficacy	• Increasing levels of competence (S)
• Four sources of self-efficacy: o Mastery experience o Vicarious experience o Verbal and social persuasion o Emotional and physiological state	• Self-efficacy (S) • Feelings of control (S) • Perception of confidence (S)

5.3 RESULTS

5.3.1 Students' Perceptions

The students' perceptions are presented thematically, namely: perceptions of formulating feedback questions; asking for or receiving unsolicited feedback; forms of feedback; quality of feedback; self-efficacy and goal orientation; future perspectives.

1. Perceptions of Formulating Feedback Questions

All students were able to define the concept of a feedback question. Definitions of a feedback question were all composed of elements such as the "specific point you are aware of, you are not good at, aspects you want to improve, and aspects you want others to give directions on how to improve." S1 indicated this as follows:

> *So maybe you already know that you have problems, for example. My feedback question was: Am I too quiet, do I give enough input? So, I already knew that I wasn't that good, so what I wanted to hear was, what do other say about it?*

The students formulated their two feedback questions in 5 to 10 minutes without much effort. They all said that they based the feedback questions on their experiences in previous study periods or in their working experiences. Sharing the feedback questions with peers and the tutor was perceived in a positive way. S6 pointed out:

> *Some of them told me that that's not quite a weak point. If I use it in another way, it would be a quality, in a way that I could be more a leader of a group. And I quite liked that, I thought it was my weak point but it's not that. It depends on how I use it.*

Half of the students reported that the tutor explicitly instructed them to seek for feedback; the other half did not report any explicit instruction. They explained that, during the PBL group work, the tutor specifically took time out of the PBL session to talk about all feedback questions. In other words, the students explicitly had to pay attention to their own feedback questions and had to contribute to the feedback questions of others. S1 said:

> *Yeah well, I just asked the question and then I listened to them to hear what they told me and then I tried to improve it for the next time.*

Seven students pointed out that the tutor guided the feedback process and one reported a more nonchalant approach, it was not always taken seriously, in the PBL group, including the tutor.

2. Asking for and Seeking Feedback

This parent node consists of the child nodes (1) asking or receiving unsolicited feedback, (2) interpretation of the feedback message, and (3) self-evaluation.

2.1 Asking for or receiving unsolicited feedback

The students' perception of the usefulness of asking and searching for feedback compared to unsolicited feedback differed. Four preferred unsolicited feedback (S2, S3, S4, S5), arguing that if they had to ask for it themselves, it might be possible that they did not receive all possible feedback, there might be aspects overlooked. S2 said,

> *You may not be aware of a mistake you made. The only way to know this is when a group member tells you so.*

S6 had an opposing opinion:

> *Well, I think that the feedback questions that we had were really useful because not everyone wants to share [their] opinion or say what they think about that person. They are like, I don't care, we are just here in a group, that's it. But it's useful to help each other, and I think that the fact that we had to do it was more useful than just the feedback that you get once in a while, and maybe you don't really care about it.*

2.2 Interpretation of the feedback message

All students responded that they improved their performance based on the feedback they asked for and received from their peers and tutor. The students indicated their improvement using terms such as being more aware of and explicitly thinking about performance.

> *S3: Well yes…if you are frequently working with this. So, in a sense, something is done, yes. And also, you are so intense occupied with this, that it is almost naturally to act.*

S5: Well, at the beginning I had some negative remarks, but by half way, when we changed our feedback questions, it became all more positive. It was noticeable that I adjusted something…I think I have tried to improve as much as possible. But I think if I had received more negative feedback I could have benefited from more of it.

S7: Yes, through the feedback, I have noticed what to change. And yes, what points are not of importance for me of what aspects I little by little can improve.

2.3 Self-evaluation

Self-evaluation was part of the feedback process: students had to write down what feedback messages they received and, after 4 weeks, were asked if they wanted to choose one or two new feedback questions. During the interviews they demonstrated that they were all aware of and able to judge their progress. One student (S3) responded as follows:

Yes, it is informative because, in a conscious way you think: What could be improved? And that is, so to say, conscious self-evaluation.

3. Forms of Feedback

Students were asked whether a specific form of feedback was recognized during the PBL group work. All recognized feedback directed at the feedback questions and, subsequently, recognized feedback on group dynamics (7: all except S5), the task (7: all except S1), the process (6: all except S2, S5), the self as a person (5: all except S2, S3, S4), and self-regulation (2: only S5, S6). S4 commented on feedback on the process:

Yes, quit often. Then we talked about missing deadlines or about ways of communicating.

S7 indicated feedback on the person as follows:

Yes, I received feedback on the person as well. They indicated that we, as Germans, are typical German: always having deadlines and firm about all the work that has to be done and finished by then.

4. Quality of the Feedback: Tutor and Peers

4.1 Feedback of the tutor.

The statements about the quality of the feedback varied. Six students were positive about the quality of the tutor feedback. Four students indicated the feedback of the tutor as good and objective (S1, S2, S3, S6). S5 indicated:

The tutor's feedback was more useful than the peers' because the tutor dares to say more than my peers.

S7 responded in a similar way by indicating that the tutor has more experience and therefore the tutors' feedback has to be taken very seriously:

> *I take this very seriously, because the tutor knows. He has a lot more practical experience and therefore, if the tutor gives feedback to me, I consider that as really important.*

Two students were less enthusiastic: S4 communicated the feedback to be good at first but diminished later on. S8 responded there was little feedback of the tutor, only "if necessary" feedback was added to the peers' feedback.

4.2 Feedback of the peers

The statements about the quality of the feedback of the peers varied as well. Four students found the quality of the feedback of the peers very useful, honest and constructive (S1, S3, S6, S7). S3 commented:

> *They notice what happens and how it happens. And not what they think happened. They observe in a very rational way, actually. They do not add emotions to it, which might influence the feedback in a negative way.*

S8 was more critical and judged the feedback varying from bad to good. S2 indicated the feedback as constructive but often the same message as during a previous meeting. S5 doubted the usefulness because of the overall positive messages. S4 was the most critical and valued the feedback of the peers as superficial.

5. Self-Efficacy and Goal Orientation

This parent node consisted of 7 child nodes. The first child nodes related to the four information sources of self-efficacy: mastery experience, vicarious experience, verbal and social persuasion, and physiological and emotional state. The students responded agreeing or disagreeing to the statements which were presented to them (see Table 5.2). Subsequently, the child nodes feelings of control; increasing levels of competence; and perception of confidence are presented.

Table 5.2. Results of self-efficacy statements

Four information sources self-efficacy	Agree	Disagree
The feedback I received made it clear to me that I am getting better at… (mastery experience)	All students agreed (S2, S3, S4 more satisfied on one feedback question)	
The feedback I received made me realize that I am as good as or even better than my peers/group members (vicarious experience)	S1 agreed	7 students disagreed
The feedback I received was mainly meant as a persuasion/encouragement (verbal and social persuasion)	S1, S2, S3, S5, S6, S7 agreed S4 partly agreed	S8 disagreed
While working in the PBL-group, I often felt anxious (physiological and emotional state)		All students disagreed

5.1 Feelings of control.

Being in control was interpreted in different ways. S6 responded:

> *Not really, because you are like in the center and everyone can judge you based on your questions. So I wasn't actually in control because I cannot control their feedback.*

S7 had a different opinion:

> *In my opinion, when I received feedback from my peers and my tutor, I could control …this week I improved this much or not, and those are the tips. How can I improve? So, I think, I can control whether I made improvements or not.*

Overall, the majority of the students (7) responded that they liked and experienced being in control.

5.2 Increasing levels of competence

All students reported an increasing level of competence on their feedback questions. S1 added the comment:

> *Yes, I think so, yeah. So because I know what I had to improve, so I tried it and I'm going to try it further so.*

5.3 Perception of confidence.

All students unanimously reported that they felt confident to ask feedback questions in their PBL group.

6. Future

The students were asked how and if they would continue this feedback approach. All of them responded positively. The following are some remarks:

> *S1: I will see in which group I am…I think sometimes I'm going to ask if I give enough input, or if I have to do more, even if it's not asked directly.*
>
> *S3: Because I want to continue my growth.*
>
> *S5: Because there are obviously more aspects to improve.*
>
> *S6: Well, I think I'm going to formulate different questions because I want to improve other points and think of other issues that I might have.*

5.3.2 Tutor Perceptions

The results of the tutor perceptions are also presented by theme: perceptions of formulating feedback questions; tutor work experience; asking for or receiving unsolicited feedback; forms of feedback; information for tutors.

1. Perception of Formulating Feedback Questions

All tutors defined a feedback question in terms of improvement and development. T2 formulated:

> *A feedback question is a question directed at aspects to develop and improve, and where you would like to receive help from others.*

The tutors described the process of formulating a feedback question as rather difficult since they had to stimulate the students to formulate 'good' questions. The time spent by the students to provide the questions to the tutor differed from 15 minutes to 1 week since they were given the opportunity to formulate the feedback questions as a homework assignment. Overall, the tutors found that, because the students were not familiar with formulating feedback questions, some of them tended to formulate similar questions. The tutors had to stimulate them to make the questions more personal. T4 indicated:

> *What struck me was that not all students understood the value and the importance of feedback, and the questions were quit similar, not really authentic or original…feedback was not already in the genes of the first-year student, so to say.*

From the tutors' point of view, the students struggled in their attempt to ask for and seek feedback. It was helpful to make use of the forms on which the feedback questions were written and to take time out of the PBL sessions to discuss and talk about the feedback questions.

2. Asking for and Seeking Feedback

This parent node consists of two child nodes: (1) development in asking for and seeking feedback and (2) examples of asking for and seeking feedback.

2.1 Development in asking for and seeking feedback.

The tutors reported different patterns in the development of asking for and seeking feedback. They attributed this, on the one hand, to the intrinsic motivation of students and, on the other hand, to the time needed to actually improve and develop. T1 said:

> *For some students, it is just an obligation, other students are really willing to learn something and enjoy the process…he asked very clear questions, his development was obvious…*

T3 said:

> *…my impression was: let's not be hard on each other…it was not an explicit part of their system yet.*

2.2 Examples of asking for and seeking feedback.

The explicit time taken out of the PBL sessions were the moments in which most students asked for and sought for feedback. One tutor (T1) discussed the German students' approach in improving their Dutch language skills:

> *Their approach is characterized by asking for a lot of feedback, and not only during the 'scheduled' moments but also out of class.*

Another tutor (T4) added a remark on the differences between males and females in their seriousness and approach of asking for feedback and indicated the males being youthful and not that serious.

3. Forms of feedback

The tutors were asked whether a specific form of feedback was used by the students and by themselves. All tutors reported that all students gave feedback directed to the feedback questions of their peers. They said that group-dynamics feedback was hardly initiated by the students and that feedback on the process was discussed only when problems arose. They also reported that feedback on the person and on the task occurred on a regular basis, but that feedback on self-regulation did not occur. However, the tutors were critical on the quality of the feedback. One tutor (T3) formulated:

> *The funny part is that it is not directed to the quality of the work but to the quantity, or the intensity. Quantity seems to be a measure for students…*

The tutors themselves directed their feedback to the feedback question frequently. T2 formulated:

Well, I provided something they have asked for. Of course, I also provided feedback on different aspects besides the feedback questions. It was pleasant to work with these questions. I was more consciously engaged in giving feedback; students did experience this in a similar way. It is a real question that is asked.

Group-dynamics feedback did not occur often. One tutor (T1) reported a delayed approach because he did not want to disturb the processes. Two tutors (T2, T3) were cautious and restrained with respect to feedback directed to a student. One tutor (T1) stated that this form should be used more often and another (T4) said that it should be strict and corrective. Feedback on the process was often given and was considered to be important by all tutors. One tutor (T1) directed feedback on self-regulation on a regular basis, the other tutors reported less use of this specific form of feedback. Feedback on the task seemed more process related. T2 indicated:

I am more concerned with the process, I think.

It has to be noted that other lecturers, not the tutors, were in charge of the assessment of the tasks.

4. Information for Tutors

The parent node information for tutors consists of two child nodes: (1) personal development and (2) difference sustainable feedback vs. feedback as previous.

4.1 Personal development of students.

All tutors indicated the personal development of students, such as the development of leadership, effective communication, and less dominant behaviors. T3 commented:

What strikes me is that positive feedback, from my point of view, is stronger than corrective feedback. Positive feedback contributes to the development of students and especially to students' self-esteem, enthusiasm and happiness…you could say that a time period of 8 to 9 weeks is relatively short, but it is good if it happens.

4.2 Difference sustainable feedback versus feedback as previous.

All tutors appreciated working with feedback questions as was done during this eight-week period. Arguments for preferring this approach compared to the usual way of working were:

T4: From week one on, it is clear which aspects a student wants to improve, instead of hearing this halfway through the period during midterm evaluations.

T2: Feedback is more tailored to students' needs.

Overall, the tutors stated that they would like to continue this approach in upcoming periods.

5.4 CONCLUSION AND DISCUSSION

Research question in this study was: How did both students and tutors perceive the use and value of sustainable feedback? The conclusions are presented and discussed in accordance with the themes of the hierarchical protocol, namely: perceptions of sustainable feedback, followed by the relation between sustainable feedback and self-efficacy and goal orientation.

5.4.1 Perceptions of sustainable feedback

Formulating questions. Students and tutors differed in their perception of the ease in which the feedback questions were formulated. The tutors observed students struggling, while the students indicated that the feedback questions were quickly thought of and written down. This difference can be explained by the different conceptions of what a 'good feedback questions' is between students and tutors. In other words, these different conceptions made students and tutors perceive the quality of the feedback questions in different ways. Tutors' perceptions led to their conclusion that not all students wanted to spend a lot of effort formulating a feedback question. The tutors perceived the quality of the feedback questions as not high enough, and from the tutor's perspective the students were easily satisfied. This aspects needs attention as formulating feedback questions is the starting point for the assessment dialogue between teachers and students. The assessment dialogue is important to enhance learning and contributes to receiving feedback but may be even more important to have students *produce* feedback (Nicol, 2010). Producing feedback is an important skill for students for learning how to judge both the quality of the work produced by their peers and of their own work (Sadler, 2010). Clarification of the criteria of a 'good' feedback questions is necessary, Carless (2006) found that tutor and student perceptions on assessment criteria differed a lot and that tutors need to do more to enhance students' understanding of criteria. Explicit discussion of these criteria should be part of the sustainable feedback process. Another clarification of the different judgment of the quality of the feedback question might be that some students are reluctant to formulate a feedback question that could show their perceived incompetence (VandeWalle, 2003). Some students might have thus chosen to formulate a relatively 'harmless' feedback question.

Although students and tutors held different opinions on the quality of the feedback questions both students and tutors defined the concept 'feedback question' in a similar way, everyone used words such as: development, improvement.

Asking for and seeking feedback. The process of asking for and seeking feedback did not occur automatically. Tutors had to take time out of the PBL sessions and let the students explicitly talk about the feedback questions. This could be indicated as a more or less 'technical/scheduled' approach, instead of a more integrated natural approach.

An explanation for this might be that both students and tutors were not experienced in asking for and seeking feedback. With respect to their preferred unsolicited feedback students remained close to their experience of receiving feedback throughout their whole educational career. They argued that essential points otherwise might be overlooked. In terms of interpretation of the feedback messages, they were all positive and concluded that they improved on the learning points they formulated as a feedback question. It might be the case that some students overestimated their improvement and subsequent performance (Narciss et al., 2014). Gonida and Leondari (2011) found that overestimators reported higher mastery and performance orientations. In other words, the effect of overestimation might be biased perceptions of self-efficacy and goal orientation. *Accurate* performance/competence beliefs are favorable: in terms of self-efficacy it is necessary that strong self-efficacy beliefs should be accompanied by actual increasing knowledge and skills in order to be able to gain mastery experience in upcoming tasks. Overestimation might hinder mastery experience. In terms of mastery orientations it is necessary to be aware of one's accurate levels of already achieved knowledge and skills to know if and how the process of mastering a task is proceeding. The tutors indicated differences in student development in the process of asking for and seeking feedback. They related these differences, among other things, to differences in motivation of the students. Learner characteristics such as motivation have been found to influence learning in general and might be critical for feedback processing (Narciss et al., 2014).

Forms of feedback. All students and tutors based their feedback on the feedback questions. Noteworthy is that students have reported feedback on group-dynamics frequently, whereas the tutors reported that this form was seldom initiated by the students themselves or by the tutors. This could be because group-dynamics might have been observed in different ways. This conclusion is supported by the statement of tutors that process feedback initiated by students only occurred in case of trouble, whereas students stated that process feedback often was used. It might be the case that the two groups used *group-dynamics* feedback and *process* feedback both interchangeably and differently. Feedback directed at a person occurred often according to the students, the tutors provided a more nuanced view of it being cautious and restrained. Feedback on the task was recognized by 7 of the 8 students, whereas tutors seemed to view task feedback as a form of process feedback. An explanation might be that other teachers, instead of the tutors, assessed and graded the PBL tasks. The tutors were more focused on the process of executing the task instead of the content of the task. Self-regulation was barely recognized by students and tutors. Although feedback on process and on self-regulation have a higher learning effect than feedback on task (Hattie & Timperley 2007), it seems difficult to distinguish between the different kinds of feedback. Improvement in feedback might be possible if teachers know and understand the differences between the different kinds of feedback and are aware of the effect of different kinds of feedback (Arts et al., 2015). Overall, it can be

concluded that feedback on the feedback question and feedback on the process/group-dynamics were the most common forms during the PBL sessions.

Quality of the feedback and information for tutors. Student perceptions of the quality of feedback of peers and tutors were generally positive. Noteworthy is the appreciation of feedback of the tutor compared to feedback of peers. Students argued that they prefer the feedback of the tutor because of the expertise tutors possess and the ability of tutors to express themselves more and more explicit. These findings are in line with the conclusion of Hanrahan and Isaacs (2001) that students doubt the knowledge of peers. Students preferring teacher feedback to peer feedback was also found by Guasch, Espasa, Alvarez, and Kirschner (2012). However, Avery (2014) found that MBA students were able to appreciate the role of peers as a source of mastery knowledge, this might imply that opposite to the less experienced undergraduate students of our study these MBA students could rely on their educational and working experience to value peer feedback. To help students to learn to value the feedback of peers, Nicol (2006) suggested that in an initial phase teachers could comment on the peer feedback, instead of solely on the quality of the work. This might help students to become less dependent of their teacher providing feedback. Working with the feedback questions provided tutors with information about individual, tailored, learning points of students. They were positive on the progress, but also indicated the relative short period of 8 weeks available for improvement.

5.4.2 The relation between sustainable feedback, self-efficacy, and goal orientation

The students evaluated the four statements on self-efficacy in a positive way, they perceived feelings of confidence, and experienced increasing levels of competence. In other words, the sustainable feedback provided them with perceived positive experiences. However, what and how students learn is regulated not only by feedback, but also by how they feel about themselves (Dweck, 2000). These feelings are reflected in personal characteristics such as self-efficacy and goal orientation. Even though all participants positively valued sustainable feedback, personal characteristics, previous experience and concomitant perceptions directed both tutors and students to specific, individual behavior and responses. Three cases are discussed:

First, students responded positively to the self-efficacy statements and perceived increasing competence. The perception of increasing competence is an important information source students evaluate and enhance their feelings of self-efficacy. This experience of success (i.e., mastery experience) provides students with information about their capabilities based on evaluation and reflection on the results obtained. However, it might be that their perception of not receiving all the possible and necessary feedback due to asking and seeking feedback by themselves influenced low self-efficacious students' mastery experience and therewith their increase of perceived

self-efficacy could be restricted. A lack of mastery experience limits self-efficacy enhancement (Narciss et al., 2014).

Second, individual characteristics influencing the preference of asking for and seeking feedback of a tutor instead of a peer. On the one hand Ng and Earl (2008) found a positive relation between student mastery orientation and feedback seeking (i.e., sources of feedback were family-related, external benchmarking, education, own opinions). On the other hand, mastery oriented students might feel that feedback of peers puts the emphasis on performance and the comparison thereof instead of emphasizing the mastery of something. If someone equal to them (i.e., a peer) indicates that their performance is not good enough this might trigger an increase of performance-avoidance. In other words, this perception of receiving peer feedback might trigger goal switching. Goal switching could occur in all possible directions: a switch of an approach goal into an avoidance goal or vice versa, but also a switch of a mastery into a performance goal or vice versa (Senko & Harackiewicz, 2005). In two separate studies they found goal switch between performance goals after exam feedback, and they found a decline in mastery striving after receiving negative feedback. They argued that competence feedback might influence competence perception and therefore influences goal orientation. In our study the perception of comparison between peers (i.e., equal roles) might direct them to a performance orientation.

Third, the way sustainable feedback was executed and guided by tutors might have influenced the perceptions of students, and thereby the way they acted on it. The tutors tended to approach the sustainable feedback in a rather 'technical' way. They explicitly took time out of class to discuss the feedback questions instead of integrating it during the PBL sessions; this might have restricted the continuous (i.e., sustainable) process of feedback seeking by students (Carless, 2006). As a consequence the assessment dialogues necessary to give meaning to the feedback did not always occur. These dialogues contribute to the clarification of the learning intentions and to share criteria for success (Carless, 2006; Ruiz-Primo, 2011). Students might have perceived sustainable feedback more as an ad hoc task. This might have inhibited the students to be actively involved as much as possible in order to stimulate the development of their self-regulation. Particularly the evolving role of students as active participants in sustainable feedback practices has been found to be crucial (Carless, Salter, Yang, & Lam, 2011). As a consequence of the tutors' approach and the way students perceived it, students might have benefitted less of the sustainable feedback.

Overall, it can be concluded that implementing a feedback design in which students and tutors have to work together in asking for and seeking feedback is a complex process. Both students and tutors have to develop a mindset to see feedback as an integrative element of teaching and learning, and have to be motivated to learn, see, and acknowledge what is needed to improve learning (Evans, 2013). Sustainable feedback within PBL requires an evolving role of students and tutors; sharing

perceptions of what feedback is, understanding the importance of the valuable feedback contribution of all participants (i.e., students, peers, and tutors), and developing skills to ask questions and to give feedback messages (Sluijsmans, Moerkerke, Van Merriënboer, & Dochy, 2001).

5.4.3 Practical and Methodological Implications

Our study contributed to the extensive feedback research by adding individual perceptions of students and tutors of sustainable feedback. Knowledge of these different perceptions and responses to sustainable feedback can be used to personalize feedback in order to be more effective. Learner's characteristics such as feelings of self-efficacy and goal orientation influence the way feedback is processed (Narciss et al., 2014). This implies that educators have to take these characteristics into account. Gaining mastery experience to enhance self-efficacy is not perceived in a similar way by all students, implying that tutors should be trained in observing students' behavior and adjust their guidance to these characteristics. Future research has to address research questions on how to personalize feedback based on learner characteristics.

Furthermore, sustainable feedback has to be an integrated part of the educational process, and not only be restricted to isolated/scheduled moments during a course or a class hour (Sadler, 2010). This implies that teachers should explicitly train their students in using sustainable feedback, how to play an active role, how to ask questions, and probably most important to stress and explain the added value and long-term effects (i.e., becoming an autonomous self-regulated learner) of sustainable feedback (Carless et al., 2011).

Our study was conducted in a PBL context within a marketing program, this might limit the transfer of the results to other learning environments and study programs because of the specific features of our context. The length of the sustainable feedback period was limited due to the real life scheduled period. A longitudinal continuation of this approach is necessary to investigate the long term effects and to replicate this approach across a range of contexts (Evans, 2013).

APPENDIX I

Codebook students	Codebook tutors
S1 Perception of formulating fb questions	T1 Perception of formulating fb questions
S2 Asking for and seeking feedback Asking or receiving feedback Interpretation of the feedback message Self-evaluation	T2 Asking for and seeking feedback Development in searching Examples of searching
S3 Forms of feedback Group dynamic On the FB question Process Self as a person Self-regulation Task	T3 Forms of feedback (student and tutor) Group dynamic On the FB question Process Self as a person Self-regulation Task
S4 Quality of the feedback Peers Tutor	T4 Information for tutors Personal development Difference normal instruction
S5 Self-efficacy and goal orientation Emotional state Feelings of control Increasing level of competence Mastery experience Perception of confidence Verbal persuasion Vicarious experience	
S6 Future perspectives	

Note. S1-6 and T1-4 are parent nodes.

6

General Discussion

6.1 INTRODUCTION

The general aim of this dissertation was to gain knowledge on the relationship between self-efficacy, goal orientation, and learning behavior (i.e., deep learning and surface learning) of students in higher education and to study whether and how it may be possible to influence the three in the context of a problem-based learning environment. Previous research has shown that performance outcomes (e.g., learning) of students are positively influenced when students are self-efficacious (Fennolar, Román, & Custas, 2007; Zimmerman, 2000), mastery oriented (Covington, 2000; Elliot &McGregor, 2001), and display deep learning behavior (Marton & Säljö, 1979). However, it can be asked how these variables interact and whether it is possible to influence all three of them. To investigate both the relations among and changeability of these variables, a sustainable feedback intervention directed at influencing all three was implemented in the Bachelor of Business Administration program of first-year marketing students in the Netherlands. The intention of the feedback intervention was to enhance students' self-efficacy and to stimulate a mastery approach and deep learning behavior.

Although the interrelations between self-efficacy, goal orientation, and learning behavior as well as their changeability have been studied extensively, the exact nature of their interrelationships is still not clear (e.g., Fryer & Elliot, 2007; Van Dinther, Dochy, & Segers, 2011; Zimmerman, 2000). For example, different *relations* have been found between self-efficacy and learning behavior: Self-efficacy positively relates to deep learning (Liem, Lau, & Nie, 2009) but also positively relates to surface learning (Phan, 2010). Studies on the *changeability* of goal orientation show inconclusive results as well. Fryer and Elliot (2007) found that mastery-approach and performance-avoidance changed on the mean-level, whereas mastery-avoidance and performance-approach did not show any change on the mean-level. However, after analyzing scores on these approaches on an individual-level, it was found that significant individual changes nevertheless occurred for mastery-avoidance and performance-approach. In addition, a decrease or increase in a certain goal orientation appears to not necessarily be accompanied by a similar decrease or increase in another goal orientation (e.g., an increase in mastery orientation is not always accompanied by a decrease in performance orientation and vice versa). In terms of changeability of self-efficacy, Van Dinther et al. (2011) reported a considerable number of intervention studies demonstrating relations between interventions and enhancing students' self-efficacy, in which mastery experience was found to be a powerful enhancer of self-efficacy (i.e., change of self-efficacy). Learning behavior studies also provide mixed results: no changes over time, unexpected changes, and the assumption that it seems easier to induce surface learning than stimulate deep learning (Vanthournout et al., 2013; Baeten et al., 2010). A characteristic of learning behaviors is that they are not dichotomous (that is to say, it is not a matter of 'either/or'); students can and do make use of aspects of both learning behaviors simultaneously. Studies in which the *relationships between*

the three concepts have been researched are scarcer. The results are not always clear and are even sometimes contradictory due to different conceptualizations of the concepts and other influencing factors such as socio-economic status, cognitive ability, and the capacity to seek responsibility (Fennolar, Román, & Cuestas, 2007). In any event, to optimize self-efficacy, goal orientation, and learning behavior at the same time, it is important to better understand the relationships between them and their changeability. More coherent results provide teachers with guidelines for developing and executing educational programs.

The studies in this dissertation contribute to this field of research and provide insights into whether said relationships and changeability can be determined, and, if so, whether sustainable feedback is an instrument to influence these concepts in predefined directions.

To study the relation between self-efficacy, goal orientation, and learning behavior, in Study 1 a theoretical framework was validated and analyzed in a one-group-three-measurement-model. Subsequently, an experimental intervention study was set up to investigate the effects of sustainable feedback on self-efficacy, goal orientation, and learning behavior. The data of this intervention study were analyzed in Study 2, parts 1 and 2. In Study 2 part 1, the relationships between goal orientation and learning behavior and the changeability thereof were analyzed, as well as the effects of sustainable feedback on goal orientation and learning behavior. In Study 2 part 2, self-efficacy and learning behavior were analyzed in terms of relationships, changeability, and the effect of the feedback intervention. Finally, in Study 3, a qualitative study was set up to explore the perceptions of students and tutors regarding sustainable feedback.

In this final chapter, a brief overview of the main findings of the four studies is presented. Subsequently, interesting or striking issues that emerged from the studies are discussed. Finally, methodological considerations and limitations as well as implications for educational practice are considered.

6.2 OVERVIEW OF THE MAIN FINDINGS

The main findings of Studies 1 and 2 (parts 1 and 2) are presented in Tables 6.2 and 6.3. Data in study 2 (parts 1 and 2) were analyzed on both the mean-level and the individual-level. An experimental and a control condition were distinguished; therefore, all data are presented for all groups as well as for the experimental and control groups. In addition to the analyses of Study 2, parts 1 and 2, the relations between self-efficacy and goal orientation were analyzed (see Table 6.1) and are reported as part of the main findings within this section. This was done to present all relations between self-efficacy, goal orientation, and learning behavior to address the main research question of this dissertation.

Table 6.1. Correlations between self-efficacy and goal orientations, study 2 (parts 1 and 2), at pre-test and post-test, all groups, experimental and control condition

		Self-efficacy					
		Total group		Experimental condition		Control condition	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Pre-test	Performance-approach	.064		.178		.082	
	Performance-avoidance	.143		-.52		.193	
	Mastery-approach	.315**		.267		.308*	
	Mastery-avoidance	-.024		-.150		.009	
Post-test	Performance-approach		.111		.210		.101
	Performance-avoidance		.165		-.022		.264*
	Mastery-approach		.298**		.317*		.292*
	Mastery-avoidance		-.021		-.101		.033

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

Table 6.2 presents the significant *relations* and *changes* found on the mean-level for all groups (All) as well as for the experimental (Exp) and control (Con) conditions. Table 6.3 presents the significant *increases* and *decreases* of the investigated variables on the individual-level for all groups in addition to the experimental and control conditions.

Table 6.2. Overview of significant relations and changes for self-efficacy, goal orientations, and learning behaviors.

	Relations				Changes			
	Study 1		*Study 2 parts 1 and 2*		*Study 1*		*Study 2 parts 1 and 2*	
	All	*All*	*Exp*	*Con*	*All*	*All*	*Exp*	*Con*
Self-efficacy (SE)	MAP+ SL- DL+	MAP+ DL+	MAP+ PAV+ DL+	MAP+ DL+	- 	+ 	 	 +
Mastery-approach (MAP)	DL+ SL- SE+	DL+ SL- SE+	DL+ SL- SE+	 SE+	 - 	 	 - 	
Mastery-avoidance (MAV)	DL+	DL+	SL-	SL+	-			
Performance-approach (PAP)	DL+	DL+ SL-	DL+		-	+	+	+
Performance-avoidance (PAV)	DL+		SE+					
Deep learning (DL)	SE+ MAP+ MAV+ PAP+ PAV+	SE+ MAP+ MAV+ PAP+	SE+ MAP+ PAP+	SE+				
Surface learning (SL)	SE- MAP-	MAP- PAP-	MAP- MAV-	MAV+	+	+		+

Note. All = Total of all of the groups; Exp = Experimental group; Con = Control group;
+ = significant increase; - = significant decrease

Overall, it can be concluded, that the positive relation between mastery-approach and self-efficacy, and the positive relation between deep learning and self-efficacy is found in all studies and in all conditions and that the changeability of the performance-approach is found in all studies and in all conditions. However, all other relations between self-efficacy, goal orientation, and learning behavior are, still, inconclusive. The same applies to the changeability of the concepts. On the mean-level for all groups, deep learning behavior relates significantly positively to self-efficacy, mastery-approach, mastery-avoidance, and performance-approach orientations. This can be seen by SE+, MAP+, MAV+, PAP+, marked in the row 'Deep Learning' and the columns 'Relations Study 1' and 'Relations Study 2 parts 1 and 2.' For all of the groups on the mean-level, surface learning behavior relates significantly negatively to the mastery-approach orientation. There are deviating results for the experimental and control groups. The results found for mastery-avoidance in the intervention study are opposite: surface learning behavior relates negatively in the experimental group and positively in the control group (see row 'Surface learning' and columns 'Relations Study 2, experimental and control'). The relation between self-efficacy and mastery-approach is found in both studies and in all groups. Only one additional relation is found for self-efficacy and performance-avoidance, which is found only in the experimental condition.

In all studies, significant changes on the mean-level are found for self-efficacy (- in Study 1 and + in Study 2), mastery-approach (- in Study 1), performance-approach (- in Study 1 and + in Study 2), and surface learning behavior (+ in both studies). This can be seen, for example, in the row 'Surface learning' and the columns 'Changes Study 1 and Study 2 parts 1 and 2,' marked with a '+'-sign. Neither performance-avoidance nor deep learning changed significantly on the mean-level in any study

Table 6.3. Overview of individual significant changes according to the Reliable Change Index on self-efficacy, goal orientation, and learning behavior in Studies 1 and 2 parts 1 and 2; change is in %.

	Study 1		*Study 2 parts 1 and 2*					
	Total of all groups		*Total of all groups*		*Experimental group*		*Control group*	
	↓	↑	↓	↑	↓	↑	↓	↑
Self-efficacy	16.9	21.5	8.7	22.1	9.7	14.5	7.1	33.3
Mastery-approach	16.4	0.0	2.9	2.9	4.8	1.6	0.0	4.7
Mastery-avoidance	5.5	0.0	2.9	4.8	4.8	1.6	0.0	9.3
Performance-approach	3.6	1.8	1	2.9	1.6	1.6	4.7	9.3
Performance-avoidance	9.1	5.5	1.9	4.8	3.3	3.3	0.0	7.0
Deep learning	12.7	30.9	21.4	17.5	0	1.6	21.4	14.3
Surface learning	3.6	29.1	14.4	28.8	16.1	27.4	11.9	31.0

Note. ↓ = significant % decrease; ↑ = significant % increase.

The results on an individual-level (Table 6.3) show goal orientation to be relatively stable; only mastery-approach in Study 1 has a larger change: 16.4% of the students show a decrease in mastery-approach (see row 'Mastery-approach' and column 'Study 1, ↓'). Self-efficacy is more subject to change; in Study 2 part 2, between 14.5% and 33.3% of the students increased their feelings of self-efficacy. However, at the same time, parts of the students show a decrease. Finally, learning behaviors show significant increases and decreases at the individual-level, of which more students increased their surface learning (between 27.4% and 31.0%) than decreased it (between 3.6% and 16.1%). Deep learning behavior shows to be very stable in the experimental groups of Study 2 parts 1 and 2: 96.4% of the students maintained their deep learning behavior. In other words, while goal orientations appear to be relatively stable (i.e., trait-like), self-efficacy and learning behavior are more subject to change on an individual-level (i.e., state-like).

The main finding of the intervention study is that sustainable feedback affected the performance-approach negatively. Also, the effect of the tutor group on the performance-approach post-test score was negative. The pre-test score positively influenced the post-test score. No significant effects of the intervention were found for other goal orientations, self-efficacy, or learning behavior.

The main findings of the qualitative study (Study 3) are that all participants positively value sustainable feedback. However, personal characteristics, previous experience about what feedback is or should be, and concomitant perceptions led both tutors and students to their own, specific way of acting upon sustainable feedback. In other words, individuals show different responses to sustainable feedback.

To sum up, the results of the studies show relations and changeability, and with this it confirms previous research which often found strong relations between mastery-approach and deep learning, and self-efficacy and deep learning. The effect of the intervention was only found for performance-approach.

6.3 GENERAL ISSUES

In this section, the following issues arising from the main findings are discussed, namely: individual-level versus mean-level analyses, learning behavior profiles, the learning environment and individual characteristics, and the intervention.

6.3.1 Individual-level analyses versus mean-level analyses

The analyses on a mean-level showed few significant changes. However, by evaluating the raw data, it appeared that this lack of effect might have been caused by large differences in the direction of the changes in the individual students. The increases and decreases in changes of individuals might cancel each other out on the mean-level. We

will illustrate this with the results found for mastery-approach and performance-approach in Study 2 (part 1).

First, the results found for mastery-approach. On the mean-level, the use of a mastery-approach decreased significantly in the experimental group (see Table 6.1). To better understand exactly what occurred in terms of mastery-approach, the reliable change index (RCI; Zahra & Hedge, 2010) was calculated by dividing the difference between pre-test and post-test scores by the standard error of the difference score. Based on this index, it was found that 4.8% of the students significantly decreased their use of a mastery-approach, 93.5% maintained it, and 1.6% increased their use of a mastery-approach. The absolute numbers showed that almost half (i.e., 25 of the 62 students decreased) of the students in the experimental group decreased in their use of a mastery-approach between pre-test and post-test. However, in this group only a few students *significantly* decreased their use of a mastery-approach on an individual-level. In other words, on an individual-level changes occurred, a few of them significantly, and on the mean-level significant change is found in only *one* direction, whereas the various underlying patterns of individuals' changes (i.e., decrease and increase) are not visible.

Second, the results found for performance-approach showed a significant increase on a mean-level in the experimental group. The RCI showed that 1.6% significantly decreased their use of performance-approach, and 1.6% significantly increased its use. Absolute numbers showed that a third (i.e., 20 of the 62 students increased) in the experimental group increased in using performance-approach. Although, the direction of significant change on a mean-level in performance-approach differs from mastery-approach a similar conclusion can be drawn, namely that on the mean-level significant change is found in only one direction.

In other words, studying this topic on an individual-level using the RCI provides more information on the changeability of self-efficacy, goal orientation, and learning behavior, namely that a significant decrease on a mean-level masks significant increases on an individual-level.

6.3.2 Learning behavior profiles

From an educational point of view, knowledge construction and the ability to transfer this constructed knowledge to changing real-life contexts is extremely important (Alt, 2015; Van Merriënboer & Kirschner, 2013). Deep learning contributes to this process of knowledge construction and transfer, because deep learning "involves the critical analysis of new ideas, linking them to already known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts" (Kester, Kirschner, & Corbalan, 2007, p. 1048). As shown in the intervention study, students' individual learning behavior within a similar learning environment varies enormously. Students' learning behavior profiles gathered at pre-test during the intervention study are presented in Figure 6.1.

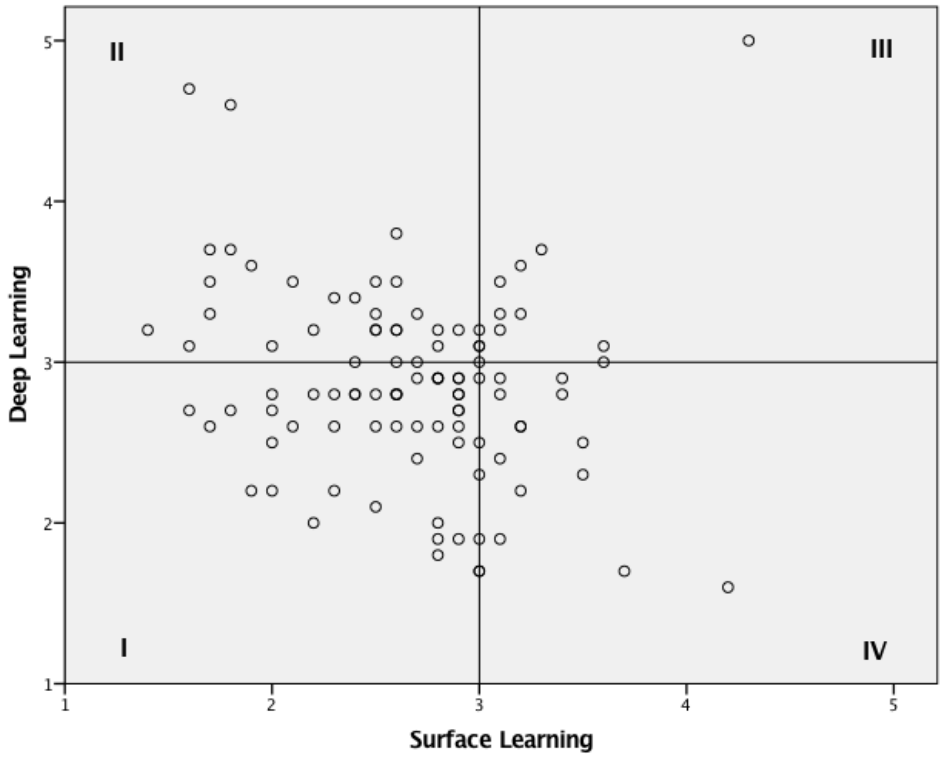

Figure 6.1. Students' deep and surface learning behavior profiles (r = -.205; *p* = .038). The X-axis is surface learning, the Y-axis is deep learning.

As can be seen in Figure 6.1, students' learning behavior has been divided into four quadrants: quadrant I shows all students with a low score on both learning behaviors, quadrant II shows all students with a low score on surface learning and a high score on deep learning, quadrant III shows all students with a high score on both learning behaviors, and quadrant IV shows all students with a high score on surface learning and a low score on deep learning. Overall, most students reported a profile of low scores on both deep and surface learning. In previous research, such a profile is indicated as dissonant or not yet established profile (Gijbels, Van de Watering, Dochy, & Van den Bossche, 2005; Lindblom-Ylänne, 2003) and is labeled as the profile of novice students who have not yet established a 'good' learning strategy (Gijbels et al., 2005; Papinczak, Young, Groves, & Haynes, 2008). Such a profile is to be expected among first-year students, as they have not yet adjusted their learning strategies to the type of learning 'expected' of them in a higher education learning environment. This novice profile which was found in our intervention study might be explained by the fact that the study was carried out with first-year students who had only recently graduated from secondary school; the students might be experiencing a gap between the demands of

studying in secondary school and those of higher education (Lindblom-Ylänne, 2004). To bridge this gap, students should be made explicitly aware that this gap exists and learn how to adjust their behavior to these 'new' higher-education demands. This, in turn, requires students to be aware of and reflect on their own learning behavior. It can, however, be asked whether first-year students have the knowledge and skills to reflect on their learning behavior in relation to the demands of the learning environment. Lindblom-Ylänne (2003, 2004) found that students lack the metacognitive skills needed to evaluate their own learning behavior in relation to what is necessary in a specific learning environment and, as a consequence, are not able to adjust their learning behavior to meet all the requirements. These findings in terms of novice student profiles, students lacking the required skills to adjust their learning behavior to the requirements of the learning environment, and the limited change found in deep learning in our intervention study have practical implications for educators. As a novice profile has been associated with low study success, it is important to diagnose students' profiles as soon as they enter higher education. A diagnostic instrument such as the Finnish *Reflections on Learning Inventory* has been found to support students in their awareness of learning behavior and also supports students in developing skills and in adjusting their approaches to learning. Lindblom-Ylänne (2003) found that working with a diagnostic instrument makes students more conscious of their learning behavior and that they were able to develop more effective learning behaviors required for their specific learning environment. In other words, regardless which learning environment students enter into in higher education, it seems worthwhile to explicitly make students aware of their learning behavior and the requirements of the learning environment.

The profile in quadrant II reflects high deep learning and low surface learning and corresponds with the deep approach profile and was interpreted as similar to the theoretical definition of deep learning (Vanthournout et al., 2009). Whereas the profile of students in quadrants I is described as novice profiles, the student profiles in quadrant III are labeled 'high ambivalent' by Vanthournout et al. (2009), with high scores on both learning behaviors. This means that learners can and do use both, depending on what situation requires. Learning behaviors are not stable traits and depend largely on the type of tasks and assessments and on how these tasks and assessments are perceived by the students (Baeten, Kyndt, Struyven, & Dochy, 2010). The students in quadrant III might have interpreted the learning environment consisting of PBL tasks and supporting lectures as appealing to both surface and deep learning. In other words, the reported learning behaviors of these students might imply that they are aware of the different requirements of the learning environment. The label 'high ambivalent' might not be a good reflection of this awareness of the different requirements and the ability to combine both deep and surface learning. Finally, the profile in quadrant IV largely corresponds with the surface approach profile and was interpreted as similar to the theoretical definition of surface learning (Vanthournout et al., 2009).

To better understand these profiles, Gijbels et al. (2005) suggested taking the age of students into account. They found that older, more experienced students exhibited more deep learning behaviors. In our intervention study, at pre-test there is a significant correlation between deep learning and age, with older students displaying more deep learning ($r = .204$, $p = .039$). These findings are, thus, in line with those of Gijbels et al. (2005). In other research, several learning behavior influencing factors have been found, such as age, gender, previous experiences, personality, and social style (Baeten et al., 2010). We conducted an additional analysis and found in our study that age differences might be an indication for the 'high ambivalent' profile: Students with scores <3 on both learning behaviors have a mean age of 19.78 years and students with scores ≥3 have a mean age of 21.38, ($t = -2.484$; $df = 52$, $p < .05$), indicating that age might positively influence the student's ability to interpret the learning requirements and to adjust their behavior to these demands. However, more in-depth qualitative research is needed to interpret these student factors in relation to this learning behavior profile.

6.3.3 The learning environment and individual learner characteristics

The educational context of the conducted studies was a problem-based learning (PBL) environment. Such environments were designed and developed to, among other things, enhance deep learning (Barrows, 1996; Papinczak et al., 2008). The aim of the sustainable feedback intervention was also directed at enhancing deep learning. Even though the learning environment was directed at enhancing deep learning, and all students participated in this learning environment, not all students responded to it similarly. Even if the 'novice profile' of first-year students is taken into account, students responded in an unexpected way with 27.4% of the students in the experimental group increasing their surface learning on an individual-level (a significant increase, see Table 6.3). Students switched from deep learning to surface learning and vice versa. This has been termed the 'Cross-over Phenomenon' by Balasooriya, Toohey, and Hughes (2009). They considered to what extent student characteristics and context characteristics influence the learning behavior students adopt. To illustrate these different responses, in our experimental group student S25 (male; age = 18) significantly increased his deep learning and significantly decreased his surface learning, and S37 (male; age = 21) maintained his deep learning behavior while significantly increasing his surface learning. Both students studied in the same learning environment but responded in different ways. Additional characteristics of both students were as follows: S25 did not report change in any goal orientation and self-efficacy, and S37 increased significantly in performance-approach and performance-avoidance. At first glance, these two students seem more or less similar; however, they participated in two different tutor groups. A cause for these different responses in terms of learning behavior, self-efficacy, and goal orientation might be the cooperation within the tutor group. The nature of the other

members of the group may influence the behaviors of group members. In other words, individual behavior is dependent on the nature of the group as a whole (i.e., the aggregate of the other members). As mentioned, S37 reported an increase in performance orientation, the specific adoption of goal orientation is explained by Hoska (1993) in terms of the learning environment students work and study in. In doing so, she distinguished competitive, cooperative, and individualistic environments. Competitive environments might emphasize success or failure and foster performance orientation, whereas cooperative environments might direct the students' attention to the execution of the task and thus a mastery orientation. Obviously, a PBL environment is directed at cooperation; however, cooperation directed at learning and the execution of tasks does not occur by itself. Van den Bossche, Gijselaers, Segers, and Kirschner (2006) stressed the necessity of attending to the development of collaborative learning behavior by, for example, adjusting the task design and/or assessment, leadership, or allocated time for group development. In the specific situation of collaborative learning in our intervention study, the combination of both group and individual assessments (i.e., 3 ECs of group PBL assignments and 4 x 3 ECs of individual tests) might have hindered collaborative learning in some cases and directed some students (e.g., S37) to a competitive approach with a concomitant performance orientation and surface learning. A practical implication from the findings in terms of group work, collaborative learning, and the influence on goal orientation and learning behavior could be that the assessment system has to be more balanced (based on the theory of assessment programs (see for example Baartman, Bastiaens, Kirschner, & Van der Vleuten, 2006, Schuwirth & Van der Vleuten, 2011)) and that specific attention should be paid to group development (see for example, Davies, 2009).

6.3.4 The intervention

Previous research presents a mixed picture of the effectiveness of feedback on learning (Hattie & Timperley, 2007; Hattie, 2013; Kluger & DeNisi, 1996). The sustainable feedback intervention used in this dissertation was based on theoretical assumptions derived from the work of Carless (2006), Nicol and MacFarlane-Dick (2006), and Boud and Molloy (2013), namely, that for feedback to be sustainable, students need to be active participants in the feedback process whereby feedback is actively sought or asked for by the students instead of having tutors or lecturers give the feedback without prior solicitation. The significant effects of the intervention on the mean-level were restricted to performance-approach. The scores at post-test were significantly negatively influenced by the intervention and the tutor group and significantly positively influenced by the students' performance-approach at pre-test. Overall, on the mean-level performance-approach significantly increased in the experimental group. In other words, the intervention and the tutor group negatively influenced the score on performance-approach at post-test; this might imply that the sustainable feedback and

the collaboration in the tutor group limited the increase in using a performance-approach (i.e., achieving passing grades).

On an individual-level, students in the experimental condition did not significantly change their deep learning behavior, whereas students in the control group exhibited significant decreases in deep learning. With some caution, this could be seen to be promising as it might imply that the sustainable feedback intervention prevented students from decreasing their deep learning behavior. However, the ultimate aim is to guide students to *increasing* their deep learning behavior. Part of the sustainable feedback intervention, directed at this, is the feedback dialogue (Carless, Salter, Yang, & Lam, 2011). In our intervention study, these feedback dialogues might not have been effective enough due to a lack of experience of the students with such a dialogue. Even though, dialogues are part of problem-based learning to solve problems, they are not specifically directed at feedback processes. To enhance these dialogues *peer coaching*, that is known from teacher education, might be helpful. Peer coaching is a non-evaluative collaboration between two students or two teachers working together, supporting and observing each other, and providing assistance, suggestions, and support (Goker, 2006). Peer coaching has been found to enhance critical thinking in postgraduate business education through dialogue about real-life tasks, sharing of perspectives, verification of knowledge, solving/dealing with cognitive conflicts, and seeing/being exposed to alternative perspectives (Ladyshewsky, 2006). The effects found for peer coaching through dialogue might strengthen the approach executed in our intervention study. These dialogues will most likely not occur by themselves and are probably not part of the repertoire of a novice student. This could be remediated by adjusting the peer coaching to the sustainable feedback in the PBL sessions by matching a more senior student/peer coach with a first-year student. During one-to-one session learning behavior, theoretical concepts and real-life problems can be discussed and perspectives shared. This approach might give first-year students the opportunity to reflect on their novice learning behavior and the more senior students the opportunity to hone their coaching skills as part of their future professional jobs. This approach might present an option for future research.

6.4 METHODOLOGICAL CONSIDERATIONS

The reliable change index is added to mean-level analyses to gain more insight into the changeability of the beliefs and behaviors of students. This index is most commonly used in clinical and health psychology (Zahra & Hedge, 2010). Statistical analyses at the mean-level can sometimes lead to conclusions that treatments or interventions had significant effects on the behaviors of people. In the context of health interventions, it is worthwhile to know whether an individual displays 'healthier' behavior and has become part of the (normal) healthy population. These statements can only be made if the

mean-score and standard deviation of the normal 'healthy' population is known. In other words, the reliable change index can be calculated, and subsequently it can be concluded whether the person has 'moved' to the normal distribution of the healthy population. In clinical practice, for example, addiction and depression scores are available for the population, but in educational practice, population scores on, for example, learning behavior are not available. In fact, it could be questioned whether a normal population distribution of self-efficacy, goal orientation, and learning behavior can be distinguished from which we could come to conclusions about whether a student is 'healthy.' In this dissertation, the RCI has been used to calculate reliable individual changes, but no statements have been made in terms of a 'normal,' for example, deep learning population. This lack of a comparison population-mean can be considered a limitation of this analysis; however, while RCI calculations do not replace analyses at the mean-level, but they do give insights into individual patterns.

Another methodological consideration is the sample sizes of the studies and, additionally, the statistical techniques that are used to analyze the data. In this study, the sample was relatively small, which prohibited testing the conceptual model using path analyses such as structural equation modeling or the use of multilevel analyses. The advantage of a path analysis is that it can identify possible interrelationships, and the advantage of multilevel analysis is to take the effect of the group on individual behavior into account. We wanted to test 'real things on real people' and as a consequence chose to conduct this research in a real-life context and, thus, increase the ecological validity of our studies. This consideration and choice limited the number of available participants (i.e., tutor groups) because we wanted to conduct our research within a PBL environment in which the approach/method of execution was uniform and with which tutors and students were familiar.

Carrying out educational research and intervention studies in an ecologically valid situation is very complex because of all the interacting variables in a real-life learning environment (Dolmans & Tigelaar, 2012). It is methodologically unfeasible to control for all of the variables (as one can do in a laboratory situation), and it is ethically improper to require students in such a situation to follow a course of study where one 'knows' beforehand that learning may be impeded. As a next step, it is necessary to bridge this gap between educational research and educational practice. Design-based research can contribute to closing this gap because it combines empirical educational research with theory-driven construction of learning environments and therefore helps in understanding how, when, and why innovation works or does not (Dolmans, De Grave, Wolfhagen, & Van Der Vleuten, 2005). Anderson and Shattuck (2012) characterized design-based research as being situated in a real educational context, focusing on the design and testing of a significant intervention, involving multiple iterations, and involving a collaborative partnership between researchers and practitioners. The studies in this dissertation were all conducted in a real-life setting in which learning takes place. The continuation of implementing and adjusting sustainable feedback according to the

principles of design-based research might contribute to the cooperation, ownership, and commitment of the researchers and practitioners, but also the iterative research, design, and evaluative process might contribute to the elaboration and implementation of the personalized sustainable feedback to and guidance of students. Another valuable feature of this approach of design-based research is the development of the research skills of the practitioners in addition to the practitioners gaining knowledge and awareness about what works and what does not.

Finally, the reliability of self-reported measurements can be questioned. Self-reported measurements indicate students' own conception of, for example, their learning behavior. However, while filling out self-reporting instruments it is not clear which reference point students choose: is it their own standard, an ideal view, or perhaps their parents or teachers view? (Veenman, Prins, & Verheij, 2003). Another instrument such as thinking-aloud measures might be a more objective instrument to learn about students' learning behavior, goal orientation, and self-efficacy. Another example of measuring what actually happens among students is the use of video observations and analyzing real-time interactions of collaborative learning (Näykki, Järvenoja, Järvelä, & Kirschner, 2015). These more objective instruments might prevent interference by personal conceptions and thus seem to be worthwhile to apply in educational research.

6.5 RECOMMENDATIONS FOR FUTURE RESEARCH

The desire to understand and influence self-efficacy, goal orientation, and learning behavior is not new and will most likely continue. Here, based on our experience in this dissertation we mention four potential directions for future research.

First, as discussed earlier, the results found in terms of the relations and changeability of self-efficacy, goal orientation, and learning behavior partly confirm the results obtained in previous research (i.e., the positive relation between mastery-approach and self-efficacy, the positive relation between deep learning and self-efficacy, and the changeability of performance-approach), all other relations and changeability are still inconclusive. The results presented in this dissertation indicate that the students participating in the sustainable feedback intervention were able to maintain their deep learning behavior, which is a promising effect but not what we were necessarily looking for. Baeten et al. (2010) reported several encouraging as well as discouraging aspects of deep learning directed at the context (e.g., assessment, feedback, teaching methods), perception of the context (e.g., workload, clarity of goals, independent study), and characteristics of the individual student (e.g., age, gender, previous experiences). Many deep learning-effect studies have focused on 'internal' influencing aspects—that is, effect measurements of elements *within* the learning environment. It might be valuable to investigate the effects of external factors (i.e.,

outside the learning environment such as societal and technological changes) on self-efficacy, goal orientation, and learning behavior. Insight-gain on these effects might help better understand the limited effects of intervention studies such as that presented in this dissertation. Research topics might include the influence of uncertainty about societal changes and future perspectives, the pressure on the length of allowable study time, and increasing admission requirements for masters programs.

Second, the implementation of sustainable feedback requires an integrative approach reflected in the training of teachers and students in all aspects of sustainable feedback, but that is also reflected in both teaching and assessment in the learning environment. To fully benefit from the advantages of sustainable feedback and to become lifelong learners, students and teachers should adopt this approach within their studies and work, with specific attention to feedback dialogues and peer coaching. Future research should address these different aspects of training and how to implement them in curricula in higher education.

Third, the developmental perspective of the studies in this dissertation requires long-term follow up; in other words a longitudinal study. As asked in the theoretical framework of this dissertation, it is not clear whether self-efficacy, goal orientation, and learning behavior can be altered during the execution of a course, or, put differently, how much time is needed to achieve significant changes. Besides this time aspect of the changeability of these three variables, it is also known that students need some time to adapt to new learning situations—such as the sustainable feedback in our intervention study. More specifically, it is essential to focus in future research on the long-term effects of sustainable feedback on self-efficacy, goal orientation, and learning behavior. It is to be expected that if explicit attention is paid to students' learning profile and to the 'gap' with the required learning profile, students can adapt faster than when this process is ignored.

Fourth, we gained an understanding of sustainable feedback. However, we also experienced the complexity of the implementation of a theory-driven sustainable feedback approach. As recommended, a follow-up according to the principles of design-based research seems worthwhile—on one hand due to the theory-driven iterative process of adjusting learning environments, and on the other hand due to the collaboration of educators and researchers to bridge the gap between educational research and practice.

To conclude, this research was conducted in a higher education setting. Within a specific context (i.e., marketing programs, problem-based learning), sustainable feedback was implemented and investigated to increase our knowledge on how to prepare students for lifelong learning. As it is known that the effectiveness of feedback differs among contexts, it is necessary on one hand to continue to adjust this sustainable feedback approach within this specific context; and on the other hand, replication in other domains might increase our knowledge on what works under what circumstances. To reap the most benefit for practice and educational research,

adjustments to this intervention and measurements of its effectiveness should be undertaken conjointly. This constitutes a promising next step toward bridging the gap between research and practice and toward learning from each other to the fullest, or in other words, to approach educational development in a sustainable way and be life-long learners, able to transfer our knowledge to new, unfamiliar situations.

Summary

This dissertation originated in a higher education setting, in the context of a rapidly changing world, which not only affects the content of study programs but also the future working environment of the alumni of these study programs. This changing world places great demands on students' attitudes, skills, and learning behavior, both at present and in the future. Educators in higher education have to contribute to the process of student development directed at gaining the knowledge and developing the skills necessary to be successful both in and beyond school. The rapidly changing real-life contexts and technological developments require knowledge construction, but moreover demand the transfer of knowledge to new, in advance unknown situations (Alt, 2015). Whole-task learning environments, such as problem-based learning, can contribute to alleviating the problems caused by these changing demands, because they stimulate the acquisition and construction of knowledge as well as the acquisition of complex cognitive skills through meaningful, real-life tasks and problems (De Kock, Sleegers, & Voeten, 2004; Van Merriënboer & Kirschner, 2013). The learning behavior students show and/or develop during their studies should contribute to this learning process of knowledge construction and the ability to transfer knowledge to unfamiliar situation concepts. A deep learning behavior might contribute the most because this behavior is characterized by the critical analysis of new ideas and linking them to already known concepts so that they can be used for problem solving in unfamiliar contexts (Kester, Kirschner, & Corbalan, 2007). How can deep learning be developed by students? Previous research has shown that self-efficacy and goal orientation are related to learning behavior. Therefore, the general aim of the research described in this thesis is to gain knowledge on the relation between self-efficacy, goal orientation, and learning behavior displayed by students in higher education, the changeability of these concepts, and the possibility to influence these concepts in the context of a PBL environment.

SELF-EFFICACY, GOAL ORIENTATION, LEARNING BEHAVIOR, AND SUSTAINABLE FEEDBACK

Learning behaviors have been associated with feelings of self-efficacy and goal orientation (Bandura, 2012; Phan, 2010). *Self-efficacy* is defined as one's belief as to whether one is able to execute the required behavior in order to achieve prospective outcomes (Bandura, 1977). Generally speaking, high self-efficacious learners are found to show deep learning behavior (Usher & Pajares, 2008; Van Dinther, Dochy, & Segers, 2011; Zimmerman, 2000). *Goal orientation* is expressed in terms of which goals can be achieved and how: when the goal is one of becoming good or better at something, it is considered to be a *mastery* orientation. On the other hand, if the goal orientation is one of obtaining good or at least sufficient grades to pass a course, then it is considered to be a *performance* orientation (Elliot & McGregor, 2001). Positive relations between

deep learning and mastery orientation have been found in an extensive body of research (Fennolar, Román, & Cuestas, 2007; Liem, Lau, & Nie, 2008; Phan, 2013). According to Phan (2013) it can be assumed that there are relations between all three concepts—self-efficacy, goal orientation, and learning behavior. Knowledge about these assumed relations can inform devising ways to stimulate deep learning in students and educate them such that they are able to deal with the changing demands of their future societal and working environments. In other words, if within a certain educational context these concepts do relate, we must know as *how* to enhance self-efficacy and increase mastery orientation and deep learning.

One of the most relevant and effective factors in enhancing learning is feedback (Carless, 2006; Hattie &Timperley, 2007; Narciss et al., 2014). However, not everything that is called feedback is effective and contributes to knowledge construction. To contribute to this learning process, feedback should be supported by feedback dialogues and activities which can support and inform students on their current task while also developing the ability to self-regulate their performance on future tasks (Carless, Salter, Yang, & Lam, 2011). This approach and focus on feedback is known as *sustainable* feedback. Considering together the assumed relations between self-efficacy, goal orientation, and learning behavior and the challenge educators face nowadays, it is worthwhile to investigate the impact of sustainable feedback on these concepts. The main research question of this dissertation is:

> 'What are the relations between self-efficacy, goal orientation, and learning behavior and are they changeable; and, if so, what are the effects of a sustainable feedback intervention?'

THE RESEARCH

This dissertation consists of a validation study, a quantitative intervention study, and a qualitative study. The validation study focused on the relation between and changeability of self-efficacy, goal orientation, and learning behavior among first-year students in higher education (Chapter 2). In the intervention study a sustainable feedback intervention was implemented, directed at influencing self-efficacy, goal orientation, and learning behavior. In addition to the intervention's effects, the relations between and changeability of the concepts were analyzed once again (Chapters 3 and 4). To give meaning to the quantitative results gathered during the intervention study, qualitative information was gathered to gain knowledge on the perceptions of tutors and students regarding sustainable feedback (Chapter 5).

The theoretical framework and study thereof among first-year students (Chapter 2)

In general, it can be stated that self-efficacy involves how students feel about themselves. It has been found that these feelings are contextual—for example, the belief that one will learn what needs to be learned can depend upon the domain that needs to be studied. A person can feel very self-efficacious about learning in one domain but have feelings of low self-efficacy in another. Self-efficacy has been associated with both deep and surface learning (Liem, Lau, & Nie, 2008). Generally speaking, highly self-efficacious students exhibit deep learning, whereas low self-efficacious student exhibit surface learning. Based on the literature, it is assumed that the relation between self-efficacy, learning behavior, and learning outcomes is an ongoing process. However, it is not clear whether a change in self-efficacy has taken place merely by reviewing the results of a task or that it is already changing in the instruction phase.

What and how students learn is known as their goal orientation, which has also been found to affect learning behavior (Stevens & Gist, 1997). Two types of goal orientation have been distinguished—namely, a mastery orientation and a performance orientation. The expectation of a learning outcome adds another classification of goal orientation: namely, an approach or avoidance orientation (Bernacki, Byrnes, & Cromley, 2012; Elliot & McGregor, 2001; Van Yperen, Elliot, & Anseel, 2009). Four types can thus be distinguished: mastery-avoidance, mastery-approach, performance-avoidance, and performance-approach. In terms of relations, positive structural paths have been found by Fenollar, Román, and Cuestas (2007) and Liem, Lau, and Nie (2008)—namely, that mastery orientation facilitates a deep learning behavior.

Besides knowledge on the relations between self-efficacy, goal orientation, and learning behavior, it can be considered whether these concepts have changed upon reviewing the results of assessments (e.g., after the end of a term) or whether they can and do change during the instruction phase. To this end, a pre-test/post-test non-equivalent group design with three repeated measures was used to study the relations between and changeability of self-efficacy, goal orientation, and learning behavior. Seventy-seven first-year Bachelor of Business Administration marketing students (i.e., Dutch and German students) in the Netherlands participated in this study. The hypothesized relations were partly confirmed: goal orientation was found to be significantly related to deep learning, and self-efficacy was found to be significantly related to a mastery-approach orientation. The results found in this study provide evidence for the changeability of most concepts: self-efficacy, mastery-approach, mastery-avoidance, and performance-approach decreased, whereas surface learning increased. Overall, it was concluded that the significant relationship between all goal orientations and deep learning behavior corresponded with a decrease in both mastery goals and performance approach goals, whereas the surface approach of learning significantly increased.

THE SUSTAINABLE FEEDBACK INTERVENTION

Based on the theoretical framework, a sustainable feedback intervention study was set up (Chapters 3 and 4). To achieve the aim of students constructing knowledge and learning how to transfer this knowledge to new situations, feedback should be supported by feedback dialogues and activities which can support and inform students on their current task while also developing the ability to self-regulate their performance on future tasks (Carless, Salter, Yang, & Lam, 2011).

The assumption is that when students actively seek feedback, instead of unidirectionally receiving tutor feedback, they themselves are in control and can give meaning to the feedback and discuss it on an equal level with their peers.

An experimental pre-test/post-test non-equivalent group design intervention study was carried out. One hundred and five first-year Bachelor of Business Administration marketing students in the Netherlands participated in this study. To investigate the effect of sustainable feedback on self-efficacy, goal orientation, and learning behavior, two conditions were distinguished: a control condition and an experimental condition.

Results found for goal orientation and learning behavior (Chapter 3)

Positive relations were found between three of the goal orientations—performance-approach, mastery-approach, and mastery-avoidance—and deep learning. Negative relations were found for mastery-approach and performance-approach with surface learning. Changes over time were found for performance-approach, mastery-approach, and surface learning. Mean-level analyses were complemented with individual-level analyses and showed more changes in both directions. The main conclusion was that deep learning did not change in the experimental group though it did (i.e., it decreased) in the control group; an explanation might be that the feedback intervention helped students maintain their deep learning behavior. The effect of the intervention occurred only in performance-approach (negatively), and the differences in performance-approach were also related to tutor groups (negatively) and previous performance-approach scores (positively). The results found in this study might imply that as deadlines of exams near, students chose an economical behavior (i.e., they became so-called *homos economicus* or 'calculating students' – a pejorative sounding name though not meant as such) so that requirements are met, and they are thus directed to a performance-approach and surface learning.

Results found for self-efficacy and learning behavior (Chapter 4)

The predicted relations between self-efficacy, learning behavior, and performance outcomes were found. Self-efficacy positively influenced performance outcomes, and surface learning negatively influenced performance outcomes. Students reporting high

self-efficacy were also found to display a deep learning behavior. Both self-efficacy and surface learning changed over the course of time in the group as a whole and in the control group. Individual-level analyses showed that in the control group more students decreased than increased in terms of deep learning, whereas in the experimental group almost all students remained stable in this approach to learning. The expected positive influence of asking for and seeking feedback on self-efficacy and learning behavior was not directly found.

Perceptions of students and tutors regarding the feedback intervention (Chapter 5)

Individual learner characteristics (e.g., self-efficacy and goal orientation) and perceptions might influence the way feedback is understood. The perceptions of students with respect to feedback depend on their frame of reference (i.e., their conceptions of what feedback is or should be), which is built on their previous experiences (Gulikers, Bastiaens, & Kirschner, 2006). Or, as Black and Wiliam (2009, p. 26) phrased it: "the teacher's agenda, the internal world of each student, and the intersubjective" are the relationships to investigate in order to better understand how feedback is used, acted on, or responded to.

It was considered how both students and tutors perceived the use and value of sustainable feedback. After the feedback intervention, students and tutors were interviewed using structured open-ended questionnaires. Overall, it can be concluded that the sustainable feedback intervention was appreciated by both students and tutors, and that shifting from tutors merely providing feedback to students asking for and seeking feedback was valued. Perceptions deviated on the quality of what a 'good' feedback question is, the achieved progress/development, and the preference for (un)solicited feedback. Finally, it can be stated that implementing a feedback design in which students and tutors have to work together in asking for and seeking feedback is a complex process. Both students and tutors have to develop a mindset to see feedback as an integrative element of teaching and learning, and both have to be motivated to learn, see, and acknowledge what is needed to improve learning (Evans, 2013). Sustainable feedback within a problem-based learning environment requires an evolving role of students and tutors, sharing perceptions of what feedback is, understanding the importance of the valuable feedback contributions of all participants (i.e, students, peers, and tutors), and developing skills to ask questions and to give feedback messages (Sluijsmans, Moerkerke, Van Merriënboer, & Dochy, 2001).

PRACTICAL IMPLICATIONS AND FUTURE RESEARCH

The main research question in this dissertation is 'What are the relations between self-efficacy, goal orientation, and learning behavior and are they changeable; and, if so, what are the effects of a sustainable feedback intervention?'

Overall, it can be concluded that the nature of the relations between self-efficacy, goal orientation, and learning behavior is still not completely clear-cut. The same applies to the changeability of the concepts. Nevertheless, several relations and changes were found, and although these results are tentative due to certain limitations of the research, it is important to investigate how changes can be stimulated. A significant negative effect of the sustainable feedback intervention was found only for performance-approach. The sustainable feedback intervention provided both students and tutors with positive experiences. Even though these positive experiences were only partially reflected in the quantitative results, practical implications and directions for future research can be distinguished.

First, individual-level analyses can and do provide information on the changeability of the concepts of self-efficacy, goal orientation, and learning behavior. For example, at the mean-level, significant changes in *one* direction are shown; however, by adding individual analyses, the various underlying patterns of change of individuals become clear. Or, at the mean-level no significant changes are shown, but at the individual-level significant changes did indeed occur. This approach might be useful for further research.

Second, student learning profiles can provide directions for educators to guide students for the development of a preferred and desired learning behavior. For example, novice student profiles can be used to help students to reflect on this profile and can be linked to the demands of the learning environment. In other words, a first step might be to help students become aware of their learning profile, and a second could be to make them aware of the demands of the learning environment to subsequently help students bridge the gap between their learning profile and the desired / required learning profile.

Third, knowledge of individual learner characteristics (e.g., self-efficacy and goal orientation) might support the guidance of students in a specific learning environment, such as problem-based learning. It is known that collaborative group work contributes to a mastery orientation; however, collaborative learning does not occur by itself. Critical issues are allocated time for group development as well as a balanced assessment system directed at collaborative learning (Van den Bossche, Gijselaers, Segers, & Kirschner, 2006).

Fourth, sustainable feedback assumes feedback dialogues. Tutors and students might not be experienced in this specific way of communicating in groups. Explicit training in addition to approaches like peer coaching might be helpful to increase the quality of the feedback dialogues.

Future research should address the long-term effects of sustainable feedback on self-efficacy, goal orientation, and learning behavior. An interesting issue might be to address the external factors influencing the three concepts as well; aspects such as uncertainty about societal changes and future perspectives, and increasing admission requirements for master programs. Furthermore, an integrated approach to implementing sustainable feedback is necessary, reflected in the training of teachers, tutors, and students in all aspects of sustainable feedback and also reflected in teaching and assessment.

Finally, this research was conducted in a higher education, real-life context with students and tutors working together and a researcher setting up an intervention. To reap the most benefit for practice and educational research, adjustments to this intervention and measurements of its effectiveness should be undertaken conjointly. This constitutes a promising next step toward bridging the gap between research and practice and toward learning from each other to the fullest—or, in other words, to approach educational development in a sustainable way and be life-long learners, able to transfer our knowledge to new, unfamiliar situations.

In sum, knowledge of the relation between and changeability of self-efficacy, goal orientation, and learning behavior supports educators in knowing how to adapt the learning environment to help students to meet the demands of today's and future society. To achieve these requirements, sustainable feedback is a promising approach *if* fully integrated in the curriculum and in the daily routine of students and teachers.

Samenvatting

Dit proefschrift vindt zijn oorsprong binnen het hoger onderwijs, in een context van een snel veranderende wereld, die niet alleen de inhoud van de studieprogramma's beïnvloedt, maar ook de toekomstige werkomgeving van de alumni van deze studieprogramma's. Deze veranderende wereld doet een groot beroep op houding, vaardigheden en leergedrag van de studenten, nu en in de toekomst. Opleiders in het hoger onderwijs dienen bij te dragen aan de ontwikkeling van studenten, gericht op het verwerven van kennis en de ontwikkeling van de benodigde vaardigheden om, zowel tijdens de studie als daarna, succesvol te zijn. De snel veranderende 'real-life' contexten en technologische ontwikkelingen vereisen kennisconstructie, maar meer nog de transfer van deze kennis naar nieuwe, vooralsnog onbekende, situaties (Alt, 2015). 'Whole-task' leeromgevingen, zoals probleemgestuurd onderwijs, kunnen bijdragen aan het tegemoet treden van de problemen die veroorzaakt worden door deze veranderende omgeving, omdat de verwerving en constructie van kennis en de verwerving van complexe, cognitieve vaardigheden door deze betekenisvolle, real-life taken wordt gestimuleerd (De Kock, Sleeger, & Voeten, 2004; Van Merriënboer & Kirschner, 2013). Het leergedrag dat studenten vertonen en/of ontwikkelen tijdens hun studie moet bijdragen aan dit proces van kennisconstructie en aan de vaardigheid tot kennistransfer naar onbekende situaties. Diep leergedrag draagt hier mogelijk het meest aan bij, omdat dit leergedrag wordt gekenmerkt door een kritische analyse van nieuwe ideeën en het koppelen van deze ideeën aan al bekende concepten, zodat ze gebruikt kunnen worden voor het oplossen van problemen in onbekende situaties (Kester, Kirschner, & Corbolan, 2007). Indien diep leergedrag wenselijk is, is inzicht in het ontwikkelen van dit leergedrag nodig. Eerder onderzoek laat zien dat self-efficacy en doeloriëntatie gerelateerd zijn aan leergedrag. Het hoofddoel van het onderzoek dat in dit proefschrift wordt beschreven is het verwerven van aanvullende kennis over de relatie tussen self-efficacy, doeloriëntatie en leergedrag van studenten in het hoger onderwijs, de veranderbaarheid van deze concepten en de mogelijkheid deze concepten te beïnvloeden binnen de context van probleemgestuurd onderwijs.

SELF-EFFICACY, DOELORIËNTATIE, LEERGEDRAG EN DUURZAME FEEDBACK

Leergedrag is geassocieerd met gevoelens van self-efficacy en doeloriëntatie (Bandura, 2012; Phan, 2010). Self-efficacy is gedefinieerd als het geloof van personen dat men in staat is het gedrag te laten zien dat nodig is om toekomstige resultaten te bereiken (Bandura, 1977). In het algemeen vertonen lerenden met een hoog gevoel van self-efficacy diep leergedrag (Usher & Pajares, 2008; Van Dinther, Dochy, & Segers, 2011; Zimmerman, 2000). De verschillende vormen van doeloriëntatie worden gedefinieerd door welke doelen bereikt kunnen worden en hoe deze bereikt kunnen worden: als het doel is om ergens goed of beter in te worden (d.w.z. iets te beheersen) dan wordt dat

een *mastery* oriëntatie genoemd. Als het doel is om een goed of tenminste een voldoende cijfer te halen (d.w.z. iets goed uitvoeren) dan wordt dat een *performance* oriëntatie genoemd (Elliot & McGregor, 2001). In eerder onderzoek zijn positieve relaties gevonden tussen diep leren en mastery oriëntatie (Fennolar, Román, & Custas, 2007; Liem, Lau, & Nie, 2008; Phan, 2013). Phan (2013) veronderstelt dat er relaties zijn tussen de drie concepten self-efficacy, doeloriëntatie en leergedrag. Kennis over deze veronderstelde relaties kan richting geven aan manieren om diep leren bij studenten te stimuleren en om ze op een dusdanige wijze op te leiden dat ze in staat zijn om te gaan met de veranderende eisen die hun toekomstige maatschappelijke- en werkomgeving stelt. In andere woorden, als binnen een bepaalde onderwijskundige context deze concepten in relatie staan tot elkaar, dan is het interessant om te weten *hoe* self-efficacy kan worden versterkt en een mastery oriëntatie en diep leren kunnen worden gestimuleerd.

Een van de meest relevante en effectieve factoren om leren te stimuleren is feedback (Carless, 2006; Hattie & Timperley, 2007; Narciss et al., 2014). Echter, niet alles wat feedback wordt genoemd is effectief en draagt bij aan kennisconstructie. Om bij te dragen aan het leerproces zou feedback ondersteund moeten worden door feedbackdialogen en activiteiten die studenten ondersteunen en informeren over hun huidige taak, maar zouden studenten tegelijkertijd de vaardigheid moeten ontwikkelen om toekomstige taken zelf te reguleren (Carles, Salter, Yang, & Lam, 2011). Deze benadering van feedback is bekend als *duurzame* feedback. Gezien de relatie tussen self-efficacy, doeloriëntatie en leergedrag enerzijds en de uitdaging die opleiders tegenwoordig onder ogen moeten zien anderzijds, is het zinvol om de invloed van duurzame feedback op deze concepten te onderzoeken. De hoofdonderzoeksvraag in dit proefschrift is:

> 'Wat is de relatie tussen self-efficacy, doeloriëntatie en leergedrag en zijn deze concepten veranderbaar; en als dat zo is, wat zijn dan de effecten hierop van een duurzame feedback interventie?'

HET ONDERZOEK

Dit proefschrift bestaat uit een validatiestudie, een kwantitatieve interventiestudie en een kwalitatieve studie. De validatiestudie is gericht op de relatie tussen en de veranderbaarheid van self-efficacy, doeloriëntatie en leergedrag onder eerstejaars studenten in het hoger onderwijs (Hoofdstuk 2). In de interventiestudie is een duurzame feedbackinterventie uitgevoerd, gericht op het beïnvloeden van self-efficacy, doeloriëntatie en leergedrag. In aanvulling op de analyse van de interventie-effecten zijn ook de relaties en de veranderbaarheid van deze concepten nogmaals geanalyseerd (Hoofdstukken 3 en 4). Om betekenis te geven aan de kwantitatieve resultaten die tijdens de interventiestudie verzameld zijn, is kwalitatieve informatie verzameld om

kennis te verkrijgen over de perceptie van duurzame feedback van de betrokken tutoren en studenten. (Hoofdstuk 5).

Het theoretische raamwerk en het onderzoek daarnaar onder eerstejaars studenten (Hoofdstuk 2)

Self-efficacy heeft betrekking op hoe studenten over zichzelf denken. Aangetoond is dat de mate van self-efficacy contextueel bepaald is. Iemand kan hoge mate van self-efficacy hebben in het ene domein en lage mate van self-efficacy in een ander domein. Self-efficacy is geassocieerd met zowel diep als oppervlakkig leren (Liem, Lau, & Nie, 2008). Er kan gesteld worden dat studenten met een hoge self-efficacy diep leren vertonen en studenten met een lage self-efficacy oppervlakkig leren vertonen. Gebaseerd op de literatuur wordt verondersteld dat de relatie tussen self-efficacy, leergedrag en en de daaruit voortvloeiende leeruitkomsten een voortdurende wisselwerking is. Het is echter niet duidelijk of een verandering in self-efficacy veroorzaakt wordt door evaluatie van de voor een taak behaalde resultaten (leeruitkomsten) of dat er ook al een verandering plaatsvindt tijdens de instructiefase.

Naast self-efficacy beïnvloedt de doeloriëntatie van studenten het leergedrag (Stevens & Gist, 1997). De verwachting ten aanzien van de leeruitkomsten voegt een tweede dimensie toe aan mastery en performance doeloriëntaties: namelijk een *approach* of een *avoidance* oriëntatie (Bernacki, Byrnes, & Cromley, 2012; Elliot & McGregor, 2001; Van Yperen, Elliot, & Anseel, 2009). Er worden dan ook vier soorten doeloriëntatie onderscheiden: mastery-approach, mastery-avoidance, performance-approach en performance-avoidance. Fennolar, Román en Cuestas (2007) en Liem, Lau en Nie (2008) toonden aan dat er een positieve relatie is tussen mastery oriëntatie en diep leren. Naast de kennis over de relatie tussen self-efficacy, doeloriëntatie en leergedrag, kan men zich afvragen of deze concepten veranderen nadat de behaalde leeruitkomsten zijn geëvalueerd (bijvoorbeeld na afloop van een lesperiode), of dat deze concepten ook al kunnen veranderen tijdens de instructiefase. Om de relatie tussen en de veranderbaarheid van self-efficacy, doeloriëntatie en leergedrag te onderzoeken is een pre-test/post-test non-equivalent group design met drie herhaalde metingen uitgevoerd. Aan de studie hebben 77 eerstejaars Bachelor of Business Administration (Nederlandse en Duitse) marketing studenten in Nederland deelgenomen. De veronderstelde relaties werden deels bevestigd; doeloriëntatie relateerde significant met diep leren, self-efficacy relateerde significant met een mastery-approach oriëntatie. De in deze studie gevonden resultaten hebben bewijs geleverd voor de veranderbaarheid van de meeste concepten: self-efficacy, mastery-approach, mastery-avoidance en performane-approach daalden, terwijl oppervlakkig leren steeg. Over het geheel genomen kan geconcludeerd worden dat de significante relatie tussen alle doeloriëntaties en diep leren correspondeerden met een daling in de beide mastery oriëntaties en in de performance-approach oriëntatie, terwijl oppervlakkig leren significant steeg.

DE DUURZAME FEEDBACK INTERVENTIE

Gebaseerd op het theoretisch raamwerk is een duurzame feedback interventie ontwikkeld (Hoofdstukken 3 en 4). Om het doel te bereiken dat studenten kennis construeren en leren deze kennis over te zetten naar nieuwe situaties, zou feedback ondersteund moeten worden door feedbackdialogen en activiteiten die studenten ondersteunen en informeren over hun huidige taak, maar zou tegelijkertijd ook de vaardigheid ontwikkeld moeten worden om toekomstige taken zelf te reguleren (Carles, Salter, Yang, & Lam, 2011). De veronderstelling is dat wanneer studenten actief naar feedback zoeken, in plaats van alleen vanuit de tutor feedback te ontvangen (eenrichtingsverkeer), zij zelf in control zijn en ze betekenis kunnen geven aan de feedback en de feedback als gelijkwaardigen kunnen bediscussiëren met hun peers.

Er is een experimentele pre-test/post-test non-equivalent group design interventie studie uitgevoerd, waarbij onderzocht is wat het effect is van duurzame feedback op self-efficacy, doeloriëntatie en leergedrag. Aan de studie hebben 105 eerstejaars Bachelor of Business Administration marketing studenten in Nederland deelgenomen.

Het effect van duurzame feedback op doeloriëntatie en leergedrag (Hoofdstuk 3)

Positieve relaties zijn gevonden tussen diep leren en drie doeloriëntaties: performance-approach, mastery-approach en mastery-avoidance. Negatieve relaties zijn gevonden tussen oppervlakkig leren en twee doeloriëntaties: mastery-approach en performance-approach. Veranderingen in de tijd zijn gevonden voor performance-approach (stijging), mastery-approach (daling) en oppervlakkig leren (stijging). Analyses op groepsniveau zijn aangevuld met analyses op individueel niveau, deze laatste analyses lieten meerdere veranderingen in beide richtingen zien. De belangrijkste conclusie was dat diep leren niet wijzigde in de experimentele groep, terwijl het wel daalde in de controle groep. Een verklaring hiervoor kan zijn dat de feedbackinterventie de studenten hielp hun diep leren gedrag vast te houden. Ten aanzien van doeloriëntatie was het effect van de interventie alleen zichtbaar in de performance-approach oriëntatie (negatief). De verschillen in performance-approach waren ook gerelateerd aan de tutorgroepen (negatief) en de pre-test performance-approach scores (positief). De mogelijke interpretatie van de resultaten is dat wanneer examens dichterbij komen studenten ‘economisch’ gedrag gaan vertonen om aan de eisen te voldoen (zij worden zogenoemde *homos economicus* of ‘calculerende studenten’, een kleinerend klinkende naam, maar niet als zodanig bedoeld) en ze worden daarmee gestuurd naar een performance-approach en naar oppervlakkig leren.

Effect van duurzame feedback op self-efficacy en leergedrag (Hoofdstuk 4)

De veronderstelde relaties tussen self-efficacy, leergedrag en de daaruit voortvloeiende leeruitkomsten zijn in deze studie gevonden. Self-efficacy beïnvloedde de behaalde leeruitkomsten positief en oppervlakkig leren beïnvloedde de behaalde leeruitkomsten negatief. Studenten die een hoge self-efficacy rapporteerden vertoonden ook diep leren. Zowel self-efficacy als oppervlakkig leren veranderden in de loop van de periode, maar dit was niet het geval in de experimentele conditie. Analyses op individueel niveau gaven aan dat in de controle groep meer studenten in diep leren daalden dan stegen, terwijl in de experimentele groep bijna alle studenten stabiel bleven in hun diep leren gedrag. De verwachte positieve invloed van vragen en zoeken naar feedback op self-efficacy en leergedrag is niet gevonden.

Percepties van studenten en tutoren ten aanzien van de feedback interventie (Hoofdstuk 5)

Individuele karakteristieken van lerenden (self-efficacy en doeloriëntatie) en percepties kunnen de wijze waarop feedback wordt begrepen beïnvloeden. De manier waarop studenten feedback percipiëren hangt af van hun referentiekader (hun opvattingen over wat feedback is of zou moeten zijn) dat is gebaseerd op hun eerdere ervaringen (Gulikers, Bastiaens, & Kirschner, 2006). Of, zoals Black en Wiliam (2009, p.26) het uitdrukken: de relaties tussen “the teacher’s agenda, the internal world of each student, and the intersubjective” moeten onderzocht worden om beter te begrijpen hoe feedback wordt gebruikt, hoe er op wordt geacteerd of wordt gereageerd.

Er is onderzocht hoe door de studenten en de tutoren het gebruik en de waarde van duurzame feedback werd gepercipieerd. Na de feedbackinterventie zijn studenten en tutoren geïnterviewd aan de hand van een gestructureerd open interview. De conclusie is dat de duurzame feedbackinterventie door zowel studenten als tutoren werd gewaardeerd en dat de verschuiving van tutoren die studenten van feedback voorzien naar studenten die vragen en zoeken naar feedback werd gewaardeerd. De percepties van de studenten en de tutoren over de kwaliteit van een goede feedbackvraag, de voortgang die was geboekt en de voorkeur voor (on)gevraagde feedback liepen uiteen. Het implementeren van een feedback design waarin studenten en tutoren moeten samenwerken in het vragen en zoeken naar feedback bleek een complex proces. Zowel studenten als tutoren moeten een mindset ontwikkelen om feedback te zien als een geïntegreerd onderdeel van lesgeven en leren en beiden moeten gemotiveerd zijn om te leren, te zien en te onderkennen wat nodig is om het leren te verbeteren (Evans, 2013). Duurzame feedback binnen een probleemgestuurde leeromgeving vereist een zich ontwikkelende rol van studenten en tutoren, het delen van percepties over wat feedback is, het begrijpen van het belang van de waardevolle feedbackbijdragen van alle participanten (studenten, peers, tutoren) en het ontwikkelen van vaardigheden om

vragen te stellen en feedbackboodschappen te geven (Sluijsmans, Moerkerke, Van Merriënboer, & Dochy, 2001).

PRAKTISCHE IMPLICATIES EN TOEKOMSTIG ONDERZOEK

De hoofdonderzoeksvraag in dit proefschrift is: 'Wat is de relatie tussen self-efficacy, doeloriëntatie en leergedrag, zijn deze concepten veranderbaar: en als dat zo is, wat zijn dan de effecten van een duurzame feedback interventie?'

Er kan geconcludeerd worden dat de aard van de relaties tussen self-efficacy, doeloriëntatie en leergedrag nog steeds niet helemaal scherp omlijnd is. Hetzelfde geldt voor de veranderbaarheid van deze concepten. Desalniettemin, verschillende relaties tussen en veranderingen in deze concepten zijn gevonden en ook al zijn dit geen sterke resultaten vanwege zekere beperkingen in dit onderzoek, het is belangrijk te onderzoeken hoe deze veranderingen kunnen worden gestimuleerd. Een negatief significant effect van de duurzame feedbackinterventie is alleen gevonden voor performance-approach. De duurzame feedbackinterventie leverde zowel voor studenten als tutoren positieve ervaringen op. Ook al zijn deze positieve ervaringen slechts deels zichtbaar in de kwantitatieve resultaten, er kunnen wel praktische implicaties en richtingen voor verder onderzoek worden aangegeven.

Ten eerste, analyses op individueel niveau geven informatie over de veranderbaarheid van de concepten self-efficacy, doeloriëntatie en leergedrag. Op groepsniveau worden bijvoorbeeld significante veranderingen in één richting gevonden, maar door het uitvoeren van analyses op individueel niveau worden verschillende onderliggende, individuele patronen van verandering zichtbaar. Of, op groepsniveau worden geen significante veranderingen gevonden, maar op individueel niveau komen wel significante veranderingen voor. Deze analyses op individueel niveau kunnen waardevol zijn voor toekomstig onderzoek.

Ten tweede, leerprofielen (oppervlakkig en diep leren) van studenten kunnen opleiders richting geven in de begeleiding van studenten, zodat deze het gewenste/vereiste leergedrag verwerven. Bijvoorbeeld, novice-profielen kunnen gebruikt worden om studenten te laten reflecteren op dit profiel en deze profielen kunnen worden gekoppeld aan de eisen van de leeromgeving. Een eerste stap zou dus kunnen zijn om studenten zich bewust te laten worden van hun eigen leerprofiel en ze vervolgens bewust te maken van de eisen die gesteld worden door de leeromgeving om ze te helpen het gat te dichten tussen hun eigen profiel en het gewenste/vereiste profiel.

Ten derde, kennis van individuele karakteristieken van lerenden (self-efficacy en doeloriëntatie) kan de begeleiding van studenten in specifieke leeromgevingen, zoals probleemgestuurd leren, ondersteunen. Het is bekend dat samenwerkend leren (samenwerken in een groep) bijdraagt aan een mastery oriëntatie, echter, samenwerkend leren ontstaat niet vanzelf. Cruciale factoren zijn de tijd die gealloceerd

is voor groepsontwikkeling en een gebalanceerd assessmentsysteem dat gericht is op samenwerkend leren (Van den Bossche, Gijselaers, Segers, & Kirschner, 2006).

Ten vierde, duurzame feedback veronderstelt feedbackdialogen. Tutoren en studenten zijn mogelijk niet ervaren om op deze wijze in groepen te communiceren. Expliciete training ter aanvulling, zoals peer coaching, zou behulpzaam kunnen zijn om de kwaliteit van de feedbackdialogen te verbeteren.

Voor toekomstig onderzoek is het interessant om zich te richten op de lange-termijn effecten van duurzame feedback op self-efficacy, doeloriëntatie en leergedrag. Interessante aspecten zouden de externe factoren kunnen zijn die deze drie concepten ook beïnvloeden, aspecten zoals onzekerheid over maatschappelijke veranderingen en toekomstperspectieven en de stijgende toelatingseisen voor masterprogramma's. Daarnaast is een geïntegreerde aanpak om duurzame feedback te implementeren noodzakelijk, dit betekent training van docenten, tutoren en studenten in het incorporeren van duurzame feedback in lesgeven en assessment.

Tot slot, dit onderzoek is uitgevoerd in het hoger onderwijs, in een real-life context met studenten en tutoren die met elkaar samenwerken en een onderzoeker die een interventie heeft ontwikkeld en uitgevoerd. Om zoveel mogelijk de vruchten van dit onderzoek te plukken voor de praktijk en voor het onderwijskundig onderzoek, zouden aanpassingen in de feedbackinterventie en de meting van de effecten van deze interventies in gezamenlijkheid moeten worden uitgevoerd. Dit kan een veelbelovende volgende stap zijn om de kloof tussen onderzoek en praktijk te overbruggen en het kan een stap zijn om zo veel mogelijk van elkaar te leren of, anders gezegd, een stap om onderwijsontwikkeling op een duurzame manier te benaderen en daarmee life-long lerenden te zijn: in staat om onze kennis over te brengen en toe te passen in nieuwe, onbekende situaties.

Samenvattend, kennis van de relatie tussen en van de veranderbaarheid van self-efficacy, doeloriëntatie en leergedrag geeft opleiders de kennis hoe de leeromgeving zodanig aan te passen dat de studenten kunnen voldoen aan de eisen van de hedendaagse en toekomstige samenleving. Om dat te bereiken is duurzame feedback een veelbelovende aanpak, als het volledig geïntegreerd is in het curriculum en in de dagelijkse routine van studenten en docenten.

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Curriculum Vitae

Gerry Geitz was born July 10, 1965, in Emmen, the Netherlands. She completed her secondary education (VWO) in 1983 at the Gemeentelijke Scholengemeenschap in Emmen. She then started studying general and business economics (teaching qualification grade 2) at Stichting Lerarenopleiding Ubbo Emmius in Groningen (now part of the NHL University of Applied Sciences). She graduated in 1987 and started as a teacher of business economics in secondary education. In addition, she studied business economics receiving her Grade 1 teaching qualification in 1991. In 1992, she began working as a teacher in business economics at the Drenthe University of Applied Sciences (Hogeschool Drenthe) in Emmen and after several years switched to a management function there. In 2011 she began as a PhD candidate at the Open Universiteit. Gerry is currently working at Stenden University of Applied Sciences in Emmen as academic dean of Marketing and International Business and Languages and as quartermaster for setting up a lectorship in problem-based learning.

PUBLICATIONS AND CONFERENCES

International (refereed) articles

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P.A. (in press). Changing learning behaviour: Self-efficacy and goal orientation in PBL groups in higher education. *International Journal of Educational Research*. doi: 10.1016/j.ijer.2015.11.001.

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Book chapters

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P.A. (2014). The influence of self-efficacy and goal orientation on learning behavior: The intervening role of feedback. In K.W. van der Hoek & H. Blom (Eds), *Nieuwe nieuwsgierigheid, Oogst van Stendenonderzoek in artikelen* [New curiousity, Harvest of Stenden research in articles] (pp. 87-103). Leeuwarden, The Netherlands: Stenden Hogeschool.

International conference presentations

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P.A. (2016, April). *Sustainable feedback in problem-based learning*. Paper accepted at American Educational Research Association Washington, US.

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P.A. (2015, December). *Goal orientation, learning behaviour, and sustainable feedback.* Paper presented at the Society for Research into Higher Education, Newport, UK.

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Geitz, G., Joosten-ten Brinke, D., & Kirschner, P.A. (2014, August). *Self-efficacy, goal orientation and learning behavior in PBL-groups in higher education.* Paper presented at the European Association for Research on Learning and Instruction SIG 4 & 17, Leuven, Belgium.

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P.A. (2014, September). *Self-efficacy, goal orientation and learning behavior in PBL-groups in higher education.* Paper presented at the European Conference on Educational Research, Porto, Portugal.

National conference presentations

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P.A. (2014, June). *Changing learning behavior: Self-efficacy and goal orientation in PBL groups in higher education for management learning.* Paper presented at the Educational Research Days, Groningen, The Netherlands.

Geitz, G., Joosten-ten Brinke, D., & Kirschner, P. A. (2012, June). *Relaties tussen self-efficacy, doeloriëntatie en leergedrag in PGO-groepen bij studenten commerciële economie.* [The influence of self-efficacy and goal orientation on learning behavior: The intervening role of feedback]. Paper presented at the Educational Research Days, Wageningen, The Netherlands.

Masterclasses

Geitz, G. (2013, 5 februari). De invloed van self-efficacy en doeloriëntatie op leergedrag: de interveniërende rol van feedback. [The influence of self-efficacy and goal orientation on learning behavior: the intervening role of feedback]. Presentation at the masterclass 'Hoe balanceer je formatief en summatief toetsen?' [How do you balance formative and summative assessment?], Heerlen, The Netherlands.