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Exploring perspectives for improving students' motivation in pre-vocational secondary education

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Chapter 6

Summary and general discussion

6.1 Introduction

The present dissertation is prompted by a major concern for students in pre-vocational secondary education: the average motivation is lower and drop-out rates are consistently higher compared to students in other forms of secondary education. Yet, pre-vocational secondary education is the gateway to further vocational education and the educational basis for a large part of our workforce. Moreover, approximately 60% of the Dutch school-going population attend pre-vocational secondary education. In other words, it is an important and substantial part of the Dutch educational system. The aim of this dissertation is to obtain more insight into what motivates students in pre-vocational secondary education and how this affects their motivational engagement when working on schoolwork. In the four empirical studies in this thesis we examined two feasible intervention points, namely 1) students' perception and appraisal of the quality of the learning environment and 2) students' self-regulation of motivation. We embedded our studies in two theoretical frameworks: Self Determination Theory and the theory on Self-Regulated Learning.

Our research into the role of the learning environment in relation to motivational engagement is inspired by developments in educational practice. The need to increase students' motivational engagement has long been felt by school leaders and teachers, especially in pre-vocational secondary education. Therefore, learning environments have been redesigned from traditional teacher-centred to student-centred learning environments based on social constructivist principles. Despite the large-scale use of student-centred learning environments in practice, the evidence of their effects on students' motivational engagement is surprisingly scarce. Searching for a theory that would do justice to the different impacts that the two learning environments are assumed to have on students' motivation, we chose the Basic Needs Theory, a theory within Self Determination Theory (SDT) (Deci & Ryan, 2000; Ryan & Deci, 1985, 2000). According to the Basic Needs

Theory, students' motivational engagement will increase if the three basic psychological needs are met: the need for autonomy, competence, and relatedness. Given the characteristics of the two different learning environments, we hypothesized that student-centred learning environments are more suitable for fulfilling students' needs and, consequently enhance students' motivational engagement.

Secondly, we studied students' self-regulation of motivation. Obviously, educators have a responsibility to optimize the learning environment, but it is assumed that students are also agents in their own learning process. Moreover: we want them to be agents in their own learning process. Their ability to self-regulate their motivation for learning should make them less vulnerable to external and internal influences that can be detrimental for their motivation for learning. In addition, self-regulation is seen as one of the essential skills that students need to function properly in an increasingly dynamic society and labor market (Educational Council, 2013). Nevertheless, self-regulation of motivation still takes a back seat, if not in research, then certainly in daily educational practice. What do we actually know about students' motivational self-regulation in the classroom, especially in pre-vocational secondary education? Based on Boekaerts' three-layered model that describes the various aspects of self-regulated learning, we focused on the goals students deem important, the motivational regulation strategies they use, and the motivational beliefs they hold (Boekaerts, 1995, 1999; Wolters, Pintrich, & Karabenick, 2005; Zimmerman, 2008).

As outcome measures in the various studies, we used motivational engagement, i.e. perceived effort, perceived pleasure/interest, and perceived persistence for schoolwork in general. In addition, we expected that higher motivational engagement would be reflected in increased achievement and reduced absenteeism. We aimed to answer the following general research question: *Is students' motivational engagement for learning in pre-vocational education related to the quality of the learning environment and to students' self-regulation*

of motivation? In the remainder of this chapter we present a summary and the results of each separate study, answering the research questions we posed:

1. What is the relation between the learning environment, students' need fulfillment, their motivational engagement (perceived effort, pleasure/interest, persistence, absenteeism), and achievement?
2. What is the relation between students' multiple content goals, and what are their goal preferences?
3. What is the relation between motivational regulation strategies and motivational engagement and achievement, and is the relation between motivational beliefs and motivational engagement and achievement mediated by the use of these strategies?

To enable the study of multiple content goals and motivational strategies in this particular population, we validated two questionnaires, aiming to answer the following questions:

4. Is the Goal Identification and Facilitation Inventory a valid instrument to measure students' multiple content goals in pre-vocational education?
5. Is Wolters' questionnaire on motivational regulation strategies a valid instrument to measure how students in pre-vocational education regulate their behaviour?

Subsequently we discuss the theoretical and practical implications. Finally, limitations of these studies are discussed and recommendations for future research and educational practice are presented.

6.2 Summary of the results of the individual studies

Chapter 2. Learning Environments

In the study described in Chapter 2 we investigated the motivational impact of the learning environment by analyzing its relation to students' need fulfillment, motivational engagement, and achievement. In order to motivate students, schools have designed student-centred

learning environments according to social constructivist principles. In a nutshell: tasks, knowledge and skills are presented in a meaningful, real-life context; students actively construct their knowledge, often in cooperation with others; and teachers, in addition to being experts on the subject, have a supporting, coaching role (Brown et al. 1989; De Kock, 2004; Salvich & Zimbardo, 2012; Savery & Duffy, 2001; Vygotsky, 1978). We hypothesized that students' basic needs (Ryan & Deci, 1985, 2000; Deci & Ryan, 2000), the need for autonomy, competence, and relatedness, are satisfied to a larger extent in a student-centred learning environment than in a traditional teacher-centred learning environment, leading to more motivational engagement. Multi-level analyses were used to distinguish differences between need fulfillment and motivational engagement at the level of individual students, classes, and the two types of learning environment.

The results of this study confirmed our expectations. Students in the student-centred learning environment perceived greater fulfillment of their psychological needs than students in the teacher-centred learning environment. They also reported to put more effort into schoolwork and perceived more pleasure/interest. Furthermore, boys in the student-centred learning environment were absent less often than boys in the teacher-centred learning environment. Apparently the student-centred learning environment is more motivating for all students, and especially for boys. Achievement, measured with standardized tests that were identical for both learning environments, did not differ per learning environment. That in itself is reassuring, given that one of the criticisms of new forms of learning is that they lead to poorer performance (see e.g., Volman, 2006 for comments on new learning). On the other hand, it is disappointing that more effort and pleasure/interest does not automatically lead to higher grades. Similar findings were observed in the study in Chapter 4. We will elaborate on the relation between motivation and achievement in the section on the limitations of our studies and recommendations for future studies.

Chapter 3. Validity of the Goal Identification and Facilitation Inventory

The study in Chapter 3 addressed the first step in our research into students' self-regulation of motivation, namely the multiple-content goals that students in pre-vocational secondary education pursue. In the field of educational research, goals have been studied extensively. A substantial body of studies show that learning goals and social goals are related to motivation for learning. Obviously, teachers want their students to adhere to mastery goals and social goals, but the assumption is that students bring a wider variety of goals into the classroom, some of which are supportive, and others detrimental for the motivation for learning (Boekaerts & Niemivirta, 2000; Mansfield, 2009; Van Veen & Peetsma, 2009; Wosnitza & Volet, 2009). It is assumed that these goals are important determinants for the direction of students' actions, the energy they put into their actions, and the persistence they show. We want to know what students' goal preferences are, and how they are related to motivational engagement.

To facilitate further study on multiple-content goals to ensure that students in pre-vocational secondary education recognize the goals presented in the GIFI, we validated the Goal Identification and Facilitation Inventory (GIFI), a questionnaire developed by Boekaerts and colleagues based on Ford and Nichols' goal taxonomy. In the interviews, firstly, students reported that all goals in the GIFI made sense and that all goals were present. To the open question 'what is most important for you at school', nearly all students answered 'getting my diploma'. For some of the students this was immediately followed by 'having fun at school, otherwise it is difficult to get my diploma'. Hence, they explicitly linked the two goals. Furthermore, students indicated that, in addition to a good relationship with parents, a good relationship with extended family was also important to them. Secondly, results from Structural Equation Modelling showed that students in pre-vocational secondary education indeed distinguished between 16 separate content goals. The reliability of the scales was

moderate to good. Furthermore, the GIFI was interpreted similarly by boys and girls, but showed some variance across classes for the goals Tranquility, Self-Determination, General Equity, Superiority, and Resource Provision, indicating that there is a slight difference in the interpretation of the questionnaire between classes concerning these goals. Thirdly, testing the concurrent validity of the goals for motivational engagement, the goal Individuality, meaning it is important to be unique, was positively and moderately related to both effort, and pleasure/interest. Social Responsibility and General Equity were positively and moderately to weakly related was related to pleasure/ interest in schoolwork. Belongingness and Superiority were negatively and weakly related to effort.

Overall, the findings of this validation do not indicate that these are the only goals that students in pre-vocational secondary education pursue, and that some caution is advised in interpreting differences in goal preferences between classes, for some of the goals, but we can conclude that the Goal Identification and Facilitation Inventory is a valid instrument to measure students' multiple content goals in pre-vocational education. However, more research is needed on what behaviour is actually triggered by one's goals.

Chapter 4. Goal preferences

The study in Chapter 4 addressed the questions of what goals are important to students, what their individual goal preferences are, and how goals are interrelated. The study was performed in vocational secondary education. We first checked whether students in this particular sample also distinguished between the 16 goals as reported in the study in Chapter 3. Preliminary results showed that several goals were grouped together. The goals Resource Acquisition ('I want to be helped by my classmates') and Resource Provision ('I want to help my classmates'), for example, were perceived as one goal. Although there is a clear difference between the two goals, namely receiving help and giving help, apparently students perceived

them as two sides of the one coin of social support. Hence, we worked with 9 goals. In order to study goal importance we used a cluster analysis and Multi-Dimensional Unfolding. The cluster analysis enabled us to classify groups of goals that resemble each other in importance. Multi-Dimensional Unfolding enabled us to visualize the preferences for the 9 goals for each individual respondent within one configuration.

The cluster analysis showed two main clusters. Drawing on the work of Boekaerts (2009), we used the terms ego goals and non-ego goals. The ego goals Superiority, Individuality, and Material Gain formed one cluster, and the remaining non-ego goals, i.e. learning-related goals, social goals, and well-being goals, formed another cluster. Hence, students perceive ego goals and non-ego goals as two distinct groups. The Multi-Dimensional Unfolding showed the same pattern, and clearly showed that most students regarded the three ego goals as least important. These goals contrasted with a large group of goals that most students reported as important; this included the Mastery and Management goals. However, the unfolding technique shows that students simultaneously deemed various goals important. Feel-good goals – e.g., Having Fun, and Belongingness – are also included in this central cluster, for girls more so than for boys. This is consistent with the findings from the interviews: the most important goal for them at school was to obtain their diploma, followed by having fun at school. Furthermore, the central group of goals includes the goals Social Responsibility, Social Support, Self-determination, and Equity. This implies that students considered ‘wanting to master the material’ to be equally important to ‘wanting to be supported and help others’ and ‘wanting to be treated fairly and have decision latitude’; thus students explicitly linked these goals.

In addition to the importance most students attributed to goals related to learning aspects and social aspects, we distinguished four unique goal patterns within this general picture. First, a group of students also expressed a preference for the Safety and Feel Good

goals, and no preference for the goals Individuality, Superiority, or Material Gain. These students adhered to learning-related goals and simultaneously did not like taking risks and simply wanted to feel at ease. A second group clearly expressed a preference for the goals Material Gain and, to a lesser extent, to the goal Superiority. Students in this group showed that, besides the importance they attached to the non-ego goals, they were also driven by more extrinsically motivating incentives. A third group of students showed preferences for the goals Material Gain and Safety. This suggests that these students are motivated by extrinsic incentives, but not in a competitive manner as shown by the second group. The fourth group of students attached value to the goal Individuality, in addition to the learning-related and social goals.

We can conclude that the ego-goals are least important to students; students show a clear preference for the group of non-ego goals. Furthermore, we roughly distinguished four groups of students with their own pattern of goal preferences.

Chapter 5. Motivational regulation strategies and motivational beliefs

The study in Chapter 5 reports research on the use of motivational regulation strategies by students in pre-vocational secondary education, and the mediational role of strategies between motivational beliefs and motivational engagement. The use of motivational regulation strategies is the core aspect of the self-regulation of motivation. According to Boekaerts and Niemivirta (2000), Boekaerts and Corno (2005), and Wolters (1998, 1999, 2003) motivational regulation strategies can help students to enhance their motivational engagement and keep working in the face of competing goals and other distractions. It is also assumed that these strategies are not used as a matter of course; it is influenced by their beliefs about learning (Eccles & Wigfield, 2002; Gollwitzer, 2012; Kuhl, 1984; Zimmerman & Schunk, 2008). Therefore, we studied strategies as a mediator between beliefs and

motivational engagement. We focused on students' beliefs about their competence and their beliefs about the value schoolwork represents for them: if students believe they are sufficiently competent to execute the task successfully and that schoolwork is worthwhile, they will be more willing to actually start putting effort into schoolwork. In addition, based on Self Determination Theory, we expect motivational regulation strategies to differ from each other in the effect they have on motivational engagement; some of the strategies have a more controlling character, regulating motivation with external incentives, e.g. rewards and punishments, whereas other strategies have a more autonomous character, regulating motivation with internal incentives linked to schoolwork and the self: e.g., the perceived value of schoolwork.

To study motivational regulation strategies we used Wolters' questionnaire, consisting of five strategies: Mastery Self-Talk, Performance Self-Talk, Self Consequating, Environmental Control, and Interest Enhancement. We first validated the questionnaire for students in pre-vocational secondary education. The data were analyzed with Structural Equation Modelling. The results of the validation showed that students distinguished between the five different strategies. However, students did not consider increasing their interest in a learning task by making it more fun ('turn learning into a game') and increasing their interest by means of attaching value ('linking schoolwork to benefits in one's daily life and future life') as one and the same strategy. Therefore, we removed the items on 'turning schoolwork into a game'. The strategy Interest Enhancement now concerns only motivating oneself by reminding oneself of the value of schoolwork. The model with five separate strategies showed a good fit, and the scales had a moderate to good reliability. This meant that we could use Wolters' questionnaire for students in pre-vocational secondary education to measure the use of these five strategies.

Average scale scores showed that students did use these strategies, but only to a limited extent. Furthermore, the correlation between most of the strategies was moderate to high: if students reported using one of the strategies, they reported that they used the other strategies as well. This was especially the case for Mastery Self-Talk and Performance Self-Talk.

Subsequently, we used Structural Equation Modelling to test how motivational regulation strategies mediate between students' motivational beliefs and motivational engagement. Our results showed, first, that the students in our study did not distinguish between reported invested effort and reported persistence. Therefore we aggregated effort and persistence and labeled it effort/persistence. As expected, strategy use partly mediated the relation between the value students ascribed to schoolwork and effort/persistence and pleasure, with moderate direct and indirect relations. This signifies that students who believe that schoolwork is valuable showed more motivational engagement, and used motivational regulation strategies to a larger extent than student who did not value schoolwork. This confirmed findings by, e.g., Peetsma and van Veen (2009). Contrary to our expectations, for students who felt competent about schoolwork the mediational role of strategy use was negligible: belief in one's own competence showed only a direct, weak relation with effort/persistence and pleasure in doing schoolwork. This signifies that students who believed themselves competent to execute schoolwork successfully did not automatically use motivational regulation strategies to protect the actual execution of schoolwork against distractions or competing goals. This confirmed the findings by Wolters (2003), who also found a weak direct relation between competence beliefs and motivational engagement, and no mediational role for motivational regulation strategies. It is not consistent, however, with models on motivation, such as Eccles and Wigfield's expectancy*value model.

Finally, although we cannot draw conclusions on significance for the effect of the individual strategies, due to multi-collinearity, we explored differences between the separate strategies in their relation to effort/persistence and pleasure. Following Wolters (1998) and Reeve (2012), based on Self Determination Theory, we hypothesized that the more controlling strategies are less beneficial for students' motivational engagement than strategies that are related to schoolwork and to the self-strategies. Findings show that Mastery Self-Talk and Interest Enhancement have stronger relations with pleasure than do Self Consequating and Performance Self-Talk. For the relation with effort/persistence the results were less consistent: more controlling strategies alternated with more autonomously regulating strategies. This means that the distinction between autonomous and controlling regulation of motivation and their differentiated effect on motivational engagement did not prove fully sustainable. Finally, no relations were found for achievement.

We can conclude that motivational strategies partly mediate the relation between the belief on value of schoolwork and motivational engagement, but more research is necessary on the role of the belief on competence. Furthermore, intervention studies are necessary to get students more acquainted with motivational regulation strategies, and start using them in a larger extent.

6.3 From results to conclusions and implications

6.3.1. Implications for SDT research in relation to the quality of the learning environment.

The first implication addresses SDT as a framework for studying the effect of learning environments in relation to motivation. We stated that there was little evidence for this effect and that we expected that SDT could provide this evidence. Our study shows that SDT is indeed an appropriate framework: the student-centred learning environment and the teacher-centred learning environment showed differences in perceived need fulfillment. The

characteristics of these learning environments can help shed some light on the mechanisms on how to fulfill these needs.

However, revisiting the characteristics of learning environments, we must conclude that SDT does not fully encompass all aspects. An important addition we made is the distinction between a sense of personal competence (I feel competent on my own account), and organizational competence, based on perceived external support (I feel competent due to support from the organization) as formulated by De Brabander and Martens (2014). This enabled us to connect need fulfillment even more to concrete characteristics of the learning environment. Furthermore, we can imagine that the inclusion of meaningful, realistic contexts and assignments in the student-centred learning environment, leads students to attach more value to learning activities. We also showed that students in a student-centred learning environment reported more pleasure and interest, which may be attributed to real-life, meaningful contexts, triggering interest for that moment. We know from Hidi and Renninger (2006) that this situational interest, triggered on the spot, can evolve into individual interest, a form of intrinsic motivation and more beneficial for long-term motivational engagement. Value, interest, and other aspects of motivation can be found in the continuum developed by Deci and Ryan (2000), but the continuum does not show how these variables are actually related. The Unified Model of Task-specific Motivation (UMTM) unifies several motivation theories (De Brabander & Martens, 2014) and relates their elements to one another. Moreover, next to the distinction between a sense of personal competence and organizational competence, as mentioned earlier, it also distinguishes between a sense of personal autonomy and perceived freedom of action: the former is an individual matter, whereas the latter depends on the environment. Finally, the model differentiates between a sense of personal relatedness and the subjective norm, which enables researchers to study motivational engagement as a result from a feeling of relatedness or as a result from peer pressure and

groups norm. The UMTM could prove to be a more comprehensive model for studying learning environments, thereby providing a more refined picture of the effect on student motivation.

The second implication zooms in in the role of relatedness. A much-heard concern from both researchers (e.g., Kirschner, Sweller & Clark, 2006) and educators about social constructivist learning environments, and the autonomy involved is that students cannot handle the freedom that comes with it. In our study a perceived feeling of autonomy went hand in hand with a perceived feeling of competence, pleasure/interest, and effort. Given the concerns expressed this is good news, and could be attributed to organizational competence and a feeling of relatedness, which was also reported in a larger extent in the student centred learning environment. Indeed, studies show that both autonomy and support are necessary for students to thrive (e.g. van Loon, Ros, & Martens, 2012; Reeve et al., 2004; Reeve, 2009; Stroet, Opdenakker & Minnaert, 2013). Findings by Minnaert, Boekaerts, De Brabander, and Opdenakker (2011) on group work with students in vocational education indicated that the fulfilment of the three basic needs is important for students' interest in the project, but at different stages in the process. Perceived relatedness both with the teacher and peers, is the most influencing factor. Perceived autonomy becomes important after the first stage of task orientation. Furthermore, in a study with children (mean age 11.8 years), Opdenakker and Minnaert (2011) also showed that the teacher played an important role in academic engagement, especially when the children perceived their teacher as being helpful and being a good instructor. With our study we added to the huge amount of evidence that the fulfilment of the basic needs is beneficial for students motivational engagement. Future studies could focus on the possible hierarchy in need fulfilment, as it may have important implications for educational practice.

A third implication concerning SDT is the use of indicators of intrinsic motivation. According to Ryan and Deci (2000), besides pleasure and interest free choice is an important indicator of intrinsic motivation: do students voluntarily choose to perform more tasks after the obligatory amount of work is done? In controlled experimental settings this seems an appropriate method, but in the actual practice of the classroom one can wonder if it is not too much to ask from a student, given possible peer pressure and the tight and full schedule of a school day. In our study on learning environments, performed in an ecologically valid setting, we used absenteeism as an outcome measure, and found that boys in the SLE were less frequently absent. In other words, they chose to go to school more often than the boys in the TLE. Therefore, we argue that absenteeism can be considered as a free choice measure, an indication of intrinsic motivation, in a non-experimental setting: will I or will I not go to school? For our study this would indicate that boys were more intrinsically motivated in the SLE, as they chose to be present more often. An alternative explanation is that students feel more related to their teacher and peers in the student-centred learning environment and therefore are more inclined to attend classes. Furthermore, as the student-centred learning environment often involves group work, which creates interdependence, students might feel more responsible. Either way, for research on motivational engagement, but also for studies that use SDT as a framework, absenteeism seems to be an appropriate and objective measure.

6.3.2. Implications for SRL: The validation of the questionnaires on multiple content goals and motivational regulation strategies

In this section we discuss the validation of the questionnaires we used in the studies on self-regulation. With these studies we have created important conditions for further research on the subject of self-regulation for this particular population. First, we discuss the validation of the GIFI on multiple content goals. The study in Chapter 3 shows that students recognize the

16 goals the GIFI aims to measure. Hence, we can answer the research question ‘Is the Goal Identification and Facilitation Inventory a valid instrument to measure students’ multiple content goals in pre-vocational education?’ affirmatively: we can use this questionnaire to study multiple-content goals. However, based on the findings in Chapter 4, we cannot assume that students always distinguish between those 16 goals. A validation of the questionnaire with a sample from vocational secondary education showed that almost all items fitted in the solution, but students scored several goals under one denominator, resulting in 9 goals. The differences we found could be attributed to the different samples we used: the study in Chapter 3 was executed with students from pre-vocational secondary education, whereas the study in Chapter 4 was executed with students who are somewhat older. One would expect that older students are more able to distinguish between the goals, but one could also argue that they are more able to identify the broader outlines of goals, taking together goals that are conceptually related.

However, we cannot simply assume that the goals that the GIFI covers all goals that students consider important. In interviews most students mentioned ‘getting their diploma’ as the most important goal at school, but we do not recognize this as one of the goals as formulated in the GIFI. Is it, for example, students’ translation of the Mastery goal? Is it a higher order goal for these students in this period of their lives? Does it serve the goal ‘Keeping a good relationship with one’s parents’ or the wish to get a proper job and provide for one’s future family? In addition, the relation with motivational engagement shows that only some of the goals are related to motivational engagement. An important question that arises from this is: how can we obtain a better view of students’ goals, in addition to the insights the GIFI provides, and how can we gain more insight into the effect goals have on students’ behaviour? Although the GIFI is based on a taxonomy that was built up over 30 years, rooted in theory, practice, and research, and part of a comprehensive theory on human

motivation, results from our interviews provide another picture of students' goals. According to the review by Massey, Gebhardt, and Garnefski (2008) adolescents' goals differ from the goals that adults deem important. We may not need a completely different goal taxonomy, but we do need to extend our measurements.

The GIFI asks about goal importance and how striving after goals is facilitated, but in studies on goals a variety of questions are used, approaching goals from a different angle. According to Wentzel (1999) a person may deem many goals important, but may not act accordingly. She thus reformulates the question as 'how often do you try to.....', so that participants' answers provide insight into the energy and time spent on a particular goal. The Achievement Goal Theory questionnaire (Elliot & Murayama, 2008), the GOAL-S (Dowson & McInerney, 2003;2004), and Mansfield's work on goals (Mansfield, 2009), for instance, explore the 'why' of a specific goal. This may reveal lower-order goals or action programs that serve a higher-order goal (Boekaerts, De Koning, & Vedder, 2006). Striving after material gain, for example, may represent a wish to be able to earn a basic living wage and 'bring home the bacon', or a desire for nice, material goods here and now. Furthermore, we detect a proximal and distal aspect in the goals 'we want to have fun' and the goal 'getting my diploma'. It is worthwhile to include work about future time perspective, for example by Peetsma and Van Veen (2011), adding the dimension of time to the study of goals: What goals are important here and now, what goals refer to the future, and what is the effect of this differentiation on motivational engagement? The method used by Little, Salmela-Aro, and Phillips (2007) in the Personal Project Analysis seems an appropriate way to dig further into what students pursue, and the meaning and consequences of these goals. The researchers started by asking the respondents to select their most important goals. Through interviews, various aspects of these goals – e.g., the support from one's environment, the influence of peers, the costs and benefits associated with the pursuit of these goals – were subsequently

examined more comprehensively, providing rich information about individual goals. The method used by Little and colleagues is somewhat comparable with the method that is used by Wolters to compose his questionnaire on motivational regulation strategies: he asked students to formulate the strategies they used. Different from the method Little and colleagues used, he subsequently categorized these strategies according to existing theoretical concepts. The advantage of this method is that the operationalization of the strategies is very concrete and close to students' reality and at the same time theoretically strong. There is a risk, however, with both the method used by Little et al. (2007) and Wolters (1998), that some important theoretical concepts will not be included. Also, students might not be aware of the goals they pursue and the strategies they use, but may only recognize them when presented in an instrument. Schwinger, von der Laden, and Spinath (2007) found a good middle ground between these two approaches. In their studies on strategies they used Wolters' existing questionnaire on strategies, added some strategies from other studies and, additionally, invited respondents to list their own strategies. The latter were subsequently categorized according to existing theoretical concepts.

Secondly, we discuss the validation of Wolters' questionnaire. We can answer the research question 'Is Wolters' questionnaire on motivational regulation strategies a valid instrument to measure how students in pre-vocational education regulate their behaviour?' positively. At the same time we need to raise a similar question as we did for the results of the GIFI: does Wolters' questionnaire include all strategies that students in pre-vocational secondary education use? We again refer to how Schwinger et al. (2007) proceeded to get a comprehensive picture of students' use of strategies by asking students to report their own strategies, in addition to the strategies in the questionnaire. We also refer to strategies like Help Seeking (Aleven, Stahl, Schworm, Fischer, & Wallace, 2003; Schunk, & Zimmerman, 2012), Emotion Regulation (Boekaerts & Pekrun, 2016; Wolters, 2003), and Delay of

Gratification (Bembenutty, 2009; Bembenutty & Karabenick, 2004), that could be a valuable addition to Wolters' questionnaire.

Concluding, the GIFI and Wolters' questionnaire provide a good start for studying the self-regulation of motivation. However, to get a better grip on the mechanisms underlying goals, motivational regulation strategies, and motivated behaviour, we need more comprehensive instruments. A broader ownership of respondents in the study on multiple content goals could facilitate goal research, as goals are quite personal and idiosyncratically determined. A broader ownership of respondents in the study on strategies could provide us with a more complete picture of the strategies students use. Therefore, we suggest that we should not work strictly from theory only, but also inductively, that is, from the respondents' point of view.

6.3.2. Implications for SRL: multiple content goals

In this section we discuss the implications of our studies for the theory of self-regulation of motivation in relation to multiple content goals. Looking at goal preferences (Chapter 4), our study shows that a group of goals is considered equally important. This group includes learning goals, social goals, and well-being goals. The attribution of similar importance to several goals simultaneously raises relevant questions: if these goals are considered equally important, what happens if one or more goals are thwarted? For students' well-being, is it necessary for all goals to be achieved, and must all goals be worked on simultaneously? The statement made by some students in the interviews – e.g., 'I want to enjoy school because otherwise it is difficult to focus on getting my diploma' – suggests a causal relation and indicates that some students perceive social goals and well-being goals as instrumental for obtaining their diploma. This finding confirms the findings by Lemos and Goncalves (2004) that goals can support each other, or, when a particular goal is not achieved, it can hamper the

fulfilment of another goal. This is modelled in Boekaerts' Dual Processing Model (Boekaerts, 2007; Boekaerts & Cascallar, 2006; Boekaerts & Corno, 2005; Boekaerts & Niemivirta, 2001). According to this model, students who perceive the task as congruent with their personal goals, values, and needs will walk the growth path, positively energizing the learning activity. Students who perceive that their personal goals do not match the learning activities will have difficulty focusing on learning activities and switch to the well-being path (Boekaerts, 2007). Seen from the perspective of this model, students tell us that it is important for researchers and educators to realize that the attainment of well-being goals and social goals are equally important to mastery goals. Indeed, the attainment of well-being goals and social goals may even be prioritized over the possible attainment of mastery goals. In the context of self-regulation, however, considering students to be agents in their learning process, these results show that the different goals that students pursue require students to regulate their behavior. Strategies can play an important role here, helping students to shift their focus temporarily from the well-being path to the mastery path.

Students' goal preferences raise other interesting issues. In addition to the group of goals that are considered equally important by most students, we distinguished roughly four additional goal patterns. What are the consequences of these specific goal preferences for students' motivational engagement? Quite a large group of students reported that it is important to have nice new things; in other words, they pursue Material Gain, either in combination with Safety or in combination with Superiority and Individuality. Seen from the perspective of the Dual Processing Model, one would expect that this would hamper the motivation for learning, as these goals are not related to goals that pave the mastery path. This would align with Self Determination Theory that states that extrinsic incentives can have detrimental effects on motivation for learning. However, in our study we did not find a relation between the goal Material Gain and motivational engagement, positive or negative.

Apparently, wanting to have nice new things does not automatically have negative consequences for the motivation for learning. Maybe the pursuit of such items is detrimental for learning only when used as a reward or punishment, or if it means that students spend valuable time on a job in order to earn money instead of learning. Taking these patterns in consideration, we need a more concrete specification of the goals that make students walk the well-being path or the mastery path; it would give us more insight in the process as depicted in the Dual Processing Model. Or we must use additional theories to understand the consequences of the patterns in goal preferences we found. The preference for all three ego goals – Material Gain, Superiority and Individuality – is, for example, congruent with the dimension of self-enhancement, as depicted in the model of basic human values by Schwartz and Bardi (2001), also described by Boekaerts and colleagues (Boekaerts, 2009; Boekaerts, De Koning & Vedder, 2006). Students who pursue these goals are driven by self-interest, which leaves little space for values that are situated opposite self-enhancement and express concern for others. The model by Schwartz & Bardi (2001) could also shed light on the consequences of another pattern we detected, especially among girls, namely the preference for the Safety goal. These girls adhere to learning goals, but also attach much importance to feeling safe and not taking risks. The questionnaire asked about risks in relation to alcohol and drugs, but also about taking risks in general. It is understandable that students want to feel safe, but extreme pursuit of safety can lead to avoidance of challenges, and to the conservation of the status quo, hampering change that is necessary to learn and develop. More research is needed to find out what the consequences of these goal patterns are for the motivation for learning.

6.3.3. Implications for SRL: motivational strategies and beliefs

The results of our study on motivational regulation strategies and their mediational function between motivational beliefs and motivational engagement have several implications. The most important implication we draw from this study is, that although students in pre-vocational secondary education use motivational regulation strategies, there is plenty of room for improvement as the use of these strategies was average to far below scale average: students do not regulate their behaviour extensively as a matter of fact.

The second implication concerns students' use of strategies in relation to their belief on the value of schoolwork. Our study shows that the more students valued their schoolwork, the more they used the motivational regulation strategies. These findings are consistent with the different phases in motivational self-regulation that are described by Boekaerts and Corno (2005), and Kuhl (1984, 2000). Students first have to decide whether they want to do their schoolwork (choice motivation), a decision that is partly determined by the value students attribute to schoolwork. Subsequently, when the choice is made, students move into the volitional phase, also referred to as volitional or executive motivation. This determines whether students will actually do schoolwork and regulate their behaviour to counteract distractions and competing goals. Wolters did not apply this distinction in the questionnaire on strategies, but in the literature (e.g., Boekaerts & Corno, 2005; Wolters, 2003) the same distinction is made for strategies. The term 'motivational strategies' is used for strategies that help students to make the actual choice to engage in schoolwork, whereas the term volitional strategies is used for strategies that help students to persist in doing schoolwork once they have made the choice to engage in schoolwork. Interest Enhancement can be labelled as a motivational strategy. We would like to see students use this strategy first, since this might help them to make the choice to engage in schoolwork. Subsequently, students can move on to volitional strategies to protect that choice, e.g. Self Consequating, Environmental Control,

Performance Self-Talk, and Mastery Self-Talk. The distinction is important for educational purposes, as different strategies are beneficial on different moment of self-regulation of motivation.

The third implication concerns the belief that one is competent to perform schoolwork successfully. Unlike the value belief, this belief does not seem to encourage students to regulate their motivation. This is not in line with several theories, nor with findings in previous studies. Apparently, the role that competence beliefs play in the self-regulation of motivation is not always that straightforward and requires a more elaborate approach. A first explanation is that students are ignorant to when and how strategies can be used: Even though one is capable of performing the task successfully, that does not mean that one does not have to cope with distractions or competing goals. In this respect, Bong (1999), Zimmerman, Bandura, and Martinez-Pons (1992), and Zimmerman (2000) made an interesting contribution. They distinguished between students' competence beliefs in relation to schoolwork and their competence beliefs in relation to self-regulation, that is, the belief that one is competent to cope with distractions and regulate one's motivation. Future research should incorporate this distinction in studies on the self-regulation of motivation. Another explanation of the lack of use of strategies in relation to the belief one is competent, could be the character of the belief. Students who believe that competence is related to intelligence and is innate and unchangeable, might see less value in the use of strategies than students who believe that competence is changeable, and related to exerted effort, a distinction made by Dweck (2006).

In conclusion, students seem to have little knowledge of motivational regulation strategies, or do not know how and when to use them. The obvious implication is that students need to learn what strategies are, and why and when they can be used. At this point I would like to refer to ongoing research by Smit, Boekaerts, & De Brabander (in preparation):

an intervention study to train the use of motivational regulation strategies. Previous intervention studies show that providing students with written motivational information on the importance of an activity ('why information') and how to proceed ('how information') increases their motivational engagement and improves their achievement (Eccles & Wigfield, 2002; Martens, De Brabander, Roozendaal, Boekaerts, & Van der Leeden, 2010; Vansteenkiste, Timmermans, Lens, Soenens, & Van den Broeck, 2008). However, in a study by Van Nuland, Boekaerts, and Martens (2010) with students from pre-vocational secondary education, written motivational information did not have an effect. Therefore, in our study, performed with six classes in pre-vocational secondary education, we actively involved students in acquiring why information on the usefulness of strategies and how information informing students on how to regulate their motivation. We used educational conversation and social learning activities, with, among other, vignettes: Students discussed and shared their knowledge and experiences about what distracts them and what motivational regulation strategies they can use. Subsequently, a number of times during the study students were asked to formulate intentions to use the strategies in case of distractions. Preliminary results show that students in the experimental group reported using strategies more extensively after the intervention. Furthermore, they reported more sense of autonomy. No results were found for motivational engagement, absenteeism, or achievement. These preliminary results suggest that students' sense of autonomy improved with increased knowledge and use of motivational regulation strategies. This may be attributed to their increased ability to take control of their own motivation for learning. However, we question the reported increased use of strategies, as it is not visible in any of the other motivational outcomes. Did students provide the answers that researchers want to hear? Were students, due to the repeated attention paid to strategies, merely more familiar with the concept of strategies? Or did students actually self-regulate their behaviour to a greater extent? The latter would be good news, but we would

like to see this reflected in motivational engagement and absenteeism as well. Unfortunately, we have to agree with Van Nuland et al. (2010) that influencing motivation is not as straightforward as might be concluded from studies with other samples.

The last implication, derived from the intervention study, concerns the difficulty to motivate students to participate in research. As our study progressed, the resistance to participation grew. This is evident in the increasing numbers of missing answers and in the comments made by students when I arrived for a next session: ‘not again.....’, ‘I already answered these questions’, ‘I want to continue with my schoolwork’. Admittedly, the last comment is rather funny, considering that the aim of our intervention is to stimulate students’ self-regulation of motivation. It is clear that students have to be motivated not only for schoolwork, but also to participate in research. From that perspective it was inspiring to see the enthusiasm with which students exchanged information with each other in the first two sessions about what distracts them and how they deal with distractions, discussing the vignettes with Wolters’ strategies.

6.4 Limitations and recommendations for future studies

The findings of the different studies in this dissertation shed some light on what influences students’ motivational engagement in pre-vocational secondary education. However, we want to discuss some limitations of the studies.

We start with limitations of a methodological nature. First, we mainly used self-report questionnaires with Likert scales. This enabled us to measure students’ perception of motivation and motivational engagement on a large scale. However, for more fine-grained information and for the interpretation of the findings, other instruments are necessary, such as additional interviews, or observations in combination with think-aloud protocols, capturing both visible behaviour and students’ mental states and coping activities. The second

methodological limitation concerns the correlational character of the studies, and the use of one-time measurements only. Although the findings are interesting and important, we cannot draw conclusions about causality. Moreover, we ignored the dynamic, reciprocal character of motivation. Though in most models motivation is depicted as a linear process – with achievement, effort, and pleasure/ interest as motivational outcomes, and need fulfillment, goals, goal orientations, and motivational beliefs as predictors – motivation is in fact a reciprocal or circular process (Bandura, 1991; Boekaerts & Cascallar 2006; Zimmerman 2000; Zimmerman & Schunk, 2008). Interest, for example, treated in our study as an outcome measure, can also be seen as a predictor, leading to stronger value beliefs, and good grades can, for example, boost students' feeling of competence. Online measurements and intervention research are necessary to establish the causal relations and the cyclical nature of motivational processes, not only in order to strengthen theories on motivational processes, but also to give teachers the necessary information on how to act. The third methodological limitation concerns the properties of Multi-Dimensional Unfolding (Chapter 4). This technique is used in marketing research to rank order and examine taste preferences. It is an excellent instrument for visualizing individual preferences of all respondents within one configuration. However, for our study we did not use a ranking order, but mean scores, derived from the Likert scales. As the scores were situated close to each other or may even be identical, a large group of goals clustered at the center of the configuration. In an ongoing study on goal preferences we used a different procedure, asking students to rank the sixteen goals on importance. We expect this to lead to a more discriminating and clearer configuration of students' goal preferences. Furthermore, Busing (Leiden University) is rapidly developing new and promising applications for MDU, including the possibility to add variables and test the significance. In our case, this will enable us to add aspects such as effort and pleasure. At a glance we will be able to see what goals students deem important

and whether this affects their motivational engagement significantly. It is clear that MDU will provide exciting possibilities in the near future.

In the next section we discuss limitations that concern the content of the studies. The first limitation of this nature has to do with the study of the self-regulation of motivation. We studied multiple content goals, motivational regulation strategies and motivational beliefs separately, while these aspects are a part of the self-regulation of motivation as a whole and are related. In our opinion we first needed more clarity, especially on how goals function, as much is still unclear. Future studies are necessary to obtain a more complete picture of the effect of goals and their position in the self-regulation of motivation as a whole.

The second set of limitations that is related to the content of the underlying studies, is the missing link between learning environments and motivational self-regulation. New forms of learning are often mentioned in the same breath as self-regulation, as if they were automatically linked. It is assumed that these forms of learning provide students with more opportunities to pursue their own goals and become agents in their own learning process (Boekaerts, 2006; Boekaerts & Cascallar; Boekaerts, De Koning, & Vedder, 2006). However, in a study by Schuitema, Peetsma, and Van Veen (2012) students did not report to self-regulate their learning or motivation more extensively in an innovative learning environment than in a traditional learning environment. Apparently, although a student-centred learning environment seem to offer the opportunities, this does not automatically lead to students using strategies or setting goals. In the classroom, specific attention should be paid to motivational processes and the opportunity to practice these processes. This will open up students' full potential to become active, self-regulating learners (Bandura, 1986, 1994). Intervention studies are necessary on how to train the use of strategies and help students set

goals that will support their learning process. Preliminary results from our intervention study on strategies, however, show that this is not an easy task.

The next set of limitations concern outcome measures. First, we asked students about schoolwork in general and did not focus on specific domains. Our results might be somewhat tempered, as it is well known that motivation differs over domains. Hence, a domain-specific approach might have led to clearer conclusions (Bong, 2004). Secondly, we focused on positive outcome measures only – e.g., pleasure, interest, effort, and achievement – while there may also be a downside to certain aspects of the learning environment, certain goals, and certain motivational strategies. For example, we did not detect a general tendency for less pleasure, interest, or effort, where the use of controlling strategies was reported, but, they could have an impact on, for example, stress and anxiety. Future research should include other variables to establish a more complete picture. Thirdly, we discuss the limitations of the use of effort and persistence, two aspects of motivational engagement as described by Reeve (2012). In our research, especially in the study on motivational regulation strategies, it seemed appropriate to measure persistence as well as effort. We assumed that if students used strategies, they would show more commitment and give up less quickly. In other words: we expected them to persist. However, students did not distinguish between effort and persistence. This was surprising, as the items in the persistence scale clearly differ from the items in the effort scale, in that the former emphasize the ability to sustain effort, even in the presence of distractions. The aggregation of the items into one scale was a pragmatic, but not a satisfactory solution as we could not prove the extra effort that might be committed as a result of strategy use. The outcome measure effort seemed to have more drawbacks. The learning environment (Chapter 2), students' beliefs, and the use of motivational regulation strategies (Chapter 5) showed a relation with effort, but there was no relation between effort and achievement. It is hardwired into our way of thinking that investing more effort in

schoolwork will lead to better results; students who do not perform well are often told that they must make more of an effort. A possible explanation for the missing relation between effort and achievement is that we measured the *quantity* of effort exerted, not the *quality* of effort. We can imagine students forcing themselves to stay put at their desk, chewing their pen, really making an effort to work, but not actually learning. We therefore advocate measures that measure effort more substantively, for example through students' use of cognitive and meta-cognitive strategies.

The limitations on outcome measures have led us to express our concern about the apparently unquestioning way that outcome measurers like effort, persistence, and achievement are used in research. For every study, not only the reliability but also the validity of the measurements for that particular sample, should be tested. Furthermore, in our opinion, we should go back even further, to the core aspects we aim to measure. How do the mechanisms that we presume present between effort, persistence, and achievement, work? What do we expect to see, and what do we want to achieve in the classroom? Moreover, how can a teacher in the classroom detect motivation or lack of motivation? Sometimes motivation is apparent when a teacher asks a question that piques curiosity: students move in their seats, show the tip of their tongue, consult with each other, want to respond, get color in their cheeks, and their ears turn red. Motivation can be visible in a buzz, in students' gestures, or a deep frown. When motivation decreases, for example when a subject is no fun, too difficult, easy, or boring, we see students zooming out, looking out of the window, fiddling with their hair. This, again, advocates not only for more observation research, but future research should pay specific attention on the manifestation of motivation in practice and the further operationalization of motivation.

6.5. Practical implications

The studies of this dissertation are motivated by the concern about the lack of motivation, higher absenteeism and higher drop-out rates in pre-vocational secondary education. Besides contributing to theories on motivation, the studies in this thesis may help educators with the question of how to enhance and increase students' motivation. Is the learning environment an instrument to tackle the problems mentioned above? Based on our first study the answer is affirmative: The learning environment made a difference in absenteeism, in the reported pleasure and interest in schoolwork, and the effort put into schoolwork. These are all indicators of motivational engagement. An obvious implication is that schools should design their learning environment according to social constructivist principles that meet the needs of students. The five characteristics listed by Savery and Duffy (2001) are very practical and constitute a clear basis for educators. However, it is not an easy task to implement such a learning environment. As Mayer (2004) states, the complexity of social constructivist learning is often underestimated, which may explain why the implementation of such a learning environment is often substandard (Roozendaal, Minnaert, & Boekaerts, 2005). Student-centred learning environments require teachers to take a different perspective on teaching, learning, and motivation, and to adopt roles that are different from the teachers' roles in a teacher-centred learning environment. For example, this study, together with a huge body of research, shows that granting students autonomy is beneficial for their motivation, provided this goes hand in hand with a feeling competence and with adequate instructional and emotional support. In my role as a teacher of secondary-school teachers and an educational consultant, I know that finding the balance between granting autonomy and providing the required structure and support is one of the questions that preoccupies both starting and more experienced teachers in secondary education. Simply repeating 'students need autonomy' as a mantra is not very helpful for teachers. Supported by other studies, our

findings also indicate that it might be advisable for educators to work on students' feeling of relatedness before they start working on students' feeling of autonomy.

The second question we asked in relation to the concerns we expressed is: is the self-regulation of motivation a suitable intervention point to tackle the problems mentioned above? When considering the implications of our findings on goals for practical use, the answer is yes, albeit with some reservations. We need to ask ourselves how we want to deal with students' goal preferences in the classroom. The goals one pursues is almost an ethical subject, as goals are quite personal, related to the individual. In our opinion is it not up to educators to approve or disapprove of certain goals. Furthermore, our insight in the benefit of certain goals is not sufficient to make recommendations about goals in the practice of the classroom. Educators can, however, mirror students' goals and the consequences for learning in order to show them what is more or less beneficial for learning. Subsequently teachers can help students to, as Boekaerts states, temporarily put certain goals on the back burner, and other goals on the front burner. Here, the use of motivational regulation strategies could prove to be useful.

Finally, do motivational regulation strategies offer possibilities to tackle problems of motivation, absenteeism and dropping out of school? We can answer this question affirmatively, but again, with some reservations: the reported use of strategies is related to motivational engagement, so this helps students to get more motivated, but we cannot automatically assume that this will reduce absenteeism and dropping out of school. However, teachers can contribute to raising students' awareness and knowledge of strategies and help them train and use strategies. This will make them less dependent on external circumstances, both now, in their future studies, and in their working career and lifelong learning (Kessels, 2005; Zimmerman, 2002). Also, judging from the results of our studies on motivational regulation strategies, the belief on value of schoolwork plays an important role, in the use of

strategies, but especially directly in motivational engagement. Students should require knowledge of motivational processes as a whole.

In conclusion, it is clear that school leaders and teachers are pivotal to students' motivation when it comes to the design of the learning environment. Paradoxical as this may sound, this also applies where students' self-regulation is concerned; it places high demands on educators. They should help students to understand how motivation works and how they can motivate themselves. Preliminary results from our intervention study on strategies show that this is not an easy task. The next important step is to further design and conduct intervention research on the self-regulation of motivation that is pragmatic, appeals to students from pre-vocational secondary education, and is suited for implementation in the reality of the classroom. The underlying studies together constitute a valuable stepping stone to intervention research in order to further strengthen students' motivation for learning, not only via the learning environment, but also via students as agents in their motivation for learning.