Stressful, important and rewarding: How higher education students experience learning in different environments
Topi Litmanen

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Supervisors:  Professor
Kirsti Lonka
University of Helsinki

Docent
Laura Hirsto
University of Helsinki

Professor
Kai Hakkarainen
University of Helsinki

Pre-examiners:  Professor
Erkki Olkinuora
University of Turku

Professor
John Richardson
The Open University, UK

Custos:  Professor
Kirsti Lonka
University of Helsinki

Opponent:  Docent
Lars-Erik Malmberg
University of Oxford, UK
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Abstract

This dissertation explores how higher education students experience their studies. Experiences were studied at three interconnected levels: cognitive, motivational and emotional; they were defined respectively as the student’s perceptions of the learning environment, study-related personal goals and emotional experiences in the learning situation.

The general research questions were: 1) What are the components of successful and unsuccessful engagement with the learning environment? 2) How do students experience different kinds of learning environments, and what kinds of roles do experiences and emotions have in the learning process? 3) To what extent are experiences of the learning environment related to the features of the faculty and student qualities?

Four empirical studies were conducted to address these questions. Studies I, II and IV were quantitative and applied self-report questionnaires, and Study I also had a follow-up setting. Study III was also a follow-up study, in which experience sampling conducted with mobile phones was accompanied with qualitative interview data. Study I explored what kinds of study-related goals students have at the beginning of their studies and how they relate to their study progress. The participants (N=133) were theology students, who at the beginning of their studies were asked to complete a questionnaire about their personal goals. Study success was followed for the first three years of their studies. The results showed that students whose study-related goals were important and stressful, and who reported progress in achieving them, advanced more rapidly in their studies. Study II focused on how students’ experiences of their learning environment are related to their well-being and academic self-concept. The participants were 610 medical students. Structural equation modelling was used to investigate the relationships between the variables under study. Experiences about the learning environment were related to how interested the students were in their studies or how exhausted they had become as a result of them. In turn, interest and exhaustion were related to higher levels of academic self-concept. A cross-sectional design was used to compare experiences between different medical schools. Novice PBL (Problem Based Learning) students experienced higher levels of exhaustion, no differences were found in the later phases of studies. Thus, the PBL environment appeared challenging, but only during the first years of study. Study III followed the experiences of nine student teachers for two 14-day follow-ups. The first follow-up consisted mostly of lectures and ordinary small-group work. The second period ran parallel to the completion of an intensive inquiry-based project that was the focus of the present study. A multivariate analysis of variance revealed that studying during the inquiry-based period produced stronger experiences of being challenged as well as more negative emotional experiences than the teacher-centred period. However, the interview data indicated that the participants enjoyed the inquiry-based period. In Study IV, the objective was to study the relations between approaches to learning and both the disciplines of the students and their perceptions of the learning environment. Altogether 2,509 students from different fields participated in the study. The results indicated that both approaches to learning and the discipline have an effect on students’ experiences of the learning environment.

The dissertation showed that combining different cognitive, motivational and emotional perspectives and using a variety of methodologies helps to build a more comprehensive picture of how higher education students experience their studies. The most important findings of this thesis were: 1) Suc-
Successful engagement with the learning environment is not merely about seeing the studies as important, being satisfied with the faculty or career choice, or seeing oneself as capable of achieving the tasks. Stress, worry about competence and to some extent exhaustion are important components of engagement in studies. 2) Negative affects, experiences of high levels of challenge and exhaustion may be essential parts of the process of gradually learning to take responsibility for both individual and collaborative learning processes. 3) Students’ experiences of their learning environment are not related to a single feature or set of features, but are connected to both their approaches to learning and the characteristics of the learning environment, such as the pedagogy used.

Keywords: higher education, learning environment, goal attainment, emotional experience, engagement
Stressaavaa, tärkeää ja palkitsevaa: miten korkeakoulutopiskelijat kokevat opiskelunsa eri ympäristöissä


Osatutkimuksessa I keskityttiin opiskelijoiden opiskelun liittyviin tavoitteisiin opintojen alussa ja siihen, miten erilaiset tavoitteet ovat yhteydessä opintomenestykseen. Tutkimuksen osallistujat (N=133) olivat teologian opiskelijoita, jotka täyttivät opintojensa alussa kyselyn opiskeluun liittyvistä henkilökohtaistaisista tavoitteista. Opintojen etenemistä seurattiin kolmen ensimmäisen opintovuoden ajan. Tulosten perusteella opiskelijat, jotka kokiivat tavoitteensa tärkeinä, stressaavina ja kokivat edistyvänä niiden toteuttamisessa, etenivät opiskeluissaan muita nopeammin.


Osatutkimuksessa IV analysoitiin kuinka lähestymistavat oppimiseen ja opiskelijoiden titeenalat ovat yhteydessä siihen miten he kokevat oppimisympäristönsä. Yhteensä 2059 opiskelijaa eri aloilla osallistui tutkimukseen. Tulokset osoittivat, että opiskelijan käsitys omasta oppimisestaan että titeenalan piirteet vaikkauttivat siihen miten opiskelijat kokevat oppimisympäristönsä.

Tämä väitöskirja osoitti, että yhdistämällä kognitioiden, motivaation ja emootioiden näkökulmia ja hyödyntämällä erilaisia menetelmiä on mahdollista hahmottaa laajemmin miten korkeakoulutopiskelijat kokevat opiskelunsa. Väitöskirjan tärkeimmät tulokset olivat: 1) Pelkkä tyttyväisyys oppi-
misypäräistöön ja itsensä näkeminen kykenevänä eivät välttämättä takaa sitoutumista opiskeluun. Parhaiten opinnoissaan menestyivät opiskelijat, jotka kokivat stressiä, huolta tulevasta pätevyydestään ja jossain määrin myös uupumusta. 2) Negatiiviset affektit ja kokemus korkeasta haasteesta ja uupumuksesta voivat olla olennainen osa prosessia, jossa opitaan ottaa vastuuta omasta ja ryhmän oppimisesta. 3) Opiskelijoiden kokemukset oppimisympäristöstä eivät ole selitetävissä yhden tekijän kautta. Ne ovat yhteydessä sekä lähestymistapaan opiskeluun että laitoksen ominaisuuksiin, kuten opetustapaan.

Avainsanat: korkeakouluopiskelu, oppimisympäristö, tavoitteet, tunteet, sitoutuminen
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This thesis is based on the following four original publications, which are referred to in the text by their Roman numerals (Studies I–IV):


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1 Introduction

This thesis examines how higher education students experience their study process and learning in different environments. The process is approached at three levels, which may be described with the questions *where*, *why* and *how* from the point of view of the student:

1. *Where* does the learning take place? How does the student perceive his or her surroundings?
2. *Why* is the student studying? For what is he or she striving?
3. *How* does the student experience the learning situation? How does it feel to study?

In this thesis, the students’ experiences are approached at different levels. Experiences of the learning environment represent the student’s cognitive relationship with his or her surroundings. Personal goals represent student’s motivation towards ones studies. Emotional experiences describe the student’s sensations in study situations. These come close to Plato’s argument in *The Republic* (Plato, 2004) that the soul is composed of three separable parts: logical (cognition), appetitive (motivational) and spirited (emotional). Modern views of emotion theories also imply that cognitive and motivational processes are integral parts of the emotion (Pekrun, 2006). The anxious wish of a student to escape from an exam, for example, may be considered to occur as three interconnected processes: cognition (cognitive representation of a desired state), motivation (escape motivation) and emotion (anxiety). According to Lazarus (1991), emotional experiences originate in perceptions about a situation and are often quick and rude evaluations made based on these perceptions. A strong emotional state is triggered if a situation is perceived as relating to personally important goals. In an irrelevant situation, such emotional states are not triggered.

In a successful engagement to studies, all three of these levels should be in line to support the learning process. First, the student experiences the learning environment as constructive and supportive. Secondly, a (from a faculty’s view) successfully engaged student strives for goals in line with and supported by the study programme. Thirdly, the actual learning situations produce encouraging emotional experiences and the challenge level of the tasks is neither too high nor too low, but just right to keep up an interest in the learning material. Although these three levels are empirically and conceptually close to one another and often occur in integrated ways, they can also occur separately. When attending an interesting class, a student may be occupied with strong emotions resulting from an argument with a friend earlier the same day, although be at the same time motivated by the learning material. That is, experiences at the three levels may occur at the same time, but relate to different antecedents. Damasio (2004) also concludes that cognition, emotion and motivation, while closely intertwined, are psychologically and neurologically different and by implication should be separated for scientific purposes.
Studies in higher education take part in a faculty, which has its own agenda. At the University level, this is stated loosely in strategy. At the University of Helsinki, it is said that “The primary aim of research and teaching is to seek truth and new knowledge” (Board of the University of Helsinki, 2012). The strategy is broken down in different faculties in order to serve the focus of the faculty in question. For example, in the Faculty of Theology “degree programmes prepare students for work in the church, schools and public administration” (Faculty of theology, University of Helsinki, 2006) while the Faculty of Medicine “trains skilled doctors and dentists” (Faculty of medicine, University of Helsinki, 2006).

Each faculty’s goal of education is manifested in physical spaces and teaching practices, which form the learning environment for a student. Current views of learning that portray it as a situated practice make it important to specify the particular context in which phenomena associated with learning are being observed (Anderman & Anderman, 2000; Brown, Collins, & Duguid, 1989). Furthermore, the European Higher Education Area (EHEA, 2010) and the Education, Audiovisual and Culture Executive Agency (EACEA, 2011) have insisted that educational institutions, including universities, and related national policy bodies in European countries should always give strong attention to improving learning environments.

A student entering the faculty has his or her own goals, which may relate to graduation or self-actualisation through learning, or more probably both (Stubb, Pyhältö, & Lonka, 2012). In this thesis these kinds of personal goals are referred to as personal projects (Little, 1983). In addition to having goals that they bring with them to the learning environment, students may also find that the learning environment can stress or bring rise to certain kinds of goals. For example, when a student enters the faculty the initial goals of learning and graduating are broken down and adjusted according to the resources and course settings of the faculty. During this process, the engagement between the student and his or her learning environment also develops. In the case of study for a Master’s degree that spans five years, it may be difficult for a lecture environment, a course or even the peer group to give rise to goals focusing on graduation if a student loses his or her conviction to finish the studies.

Whereas perceptions of the learning environment reflect students’ cognitive relationship to their surroundings and goals describe their aspirations, something is missing if emotional experiences are not taken into consideration during learning. Although research had for a long time ignored the role of emotions in learning, it is apparent that students experience a wide range of emotions while studying (Pekrun, Goetz, Titz, & Perry, 2002) and, that emotions relate to engagement and the approach to learning in a study situation (Ainley, Corrigan, & Richardson, 2005; Boekaerts, 2007; Efklides & Petkaki, 2005; Pekrun, Frenzel, Goetz, & Perry, 2007). Parallel to emotions and relating to them, another aspect is the experienced challenge of the task and the competence to complete it successfully. Although these two should be in line with each other to support concentration and involvement (Inkinen et al., 2013; Moneta & Csikszentmihalyi, 1996), it appears that many learning situations do not capture the optimal level of competence and challenge (Muukkonen, Hakkarainen, Inkinen, Lonka, & Salmela-Aro, 2008).
Perceptions of the learning environment, motivational goals and emotional experiences also differ in their temporal positions. Perceptions of the learning environment are constructed based on occurrences that have already taken place and therefore focus on representations of past experiences. Personal goals focus on what a person is trying to achieve or will be working on in the near future and therefore represent future aspirations, but emotional experiences take place in the present and in the situation in which they are experienced. Although experiences on these three levels may be related, they are different in nature. The multiple levels of students’ experience of their learning, also emphasize the need to use appropriate methods that focus on the past, future and the present accordingly. The best way to study the effects of these different contexts of learning is to examine the relationship between students’ experiences alongside their perceptions of the learning environment, motivation and situational experiences at separate but interconnected levels.

Another reason for using triangulation of multiple methods is Gigerenzer’s (1991) notion that the methods and instruments that are used shape the kinds of theories that are developed when using them. A certain statistical method, for example is adaptable for certain kinds of settings. The use of that method directs one to search for questions appropriate for the method, collect data suited for the method and further on how the results are interpreted. Therefore, different premises give the researchers different views into what can be known about students’ experiences. Similarly, and maybe even more profoundly as Kuhn (1962) argues, as members of a scientific community scientists follow a paradigm, which states what is to be observed, how questions are to be studied and in what way results are to be interpreted. A paradigm therefore states the collection of accepted facts and theories. Viewing students’ perceptions from different points of view may help in opening new lines of inquiry between or beyond the commonly used or acknowledged research conventions.

1.1 The university as a learning environment

The term ‘learning environment’ is not clearly defined. Educational researchers often use it as a rather general phrase to discuss unspecified issues in education places and activities (Abualrub, Karseth, & Stensaker, 2013; Grabinger & Dunlap, 1995). However, student’s perceptions of the learning context are an integral part of the learning process. There is evidence to show that students’ experiences of teaching and assessment are strongly related to their interests, attitudes to studying and approaches to academic tasks (Biggs & Tang, 2011; Entwistle & Ramsden, 1983; Shernoff, 2012). In this thesis the focus is on how a student perceives the environment as supporting his or her learning, a perspective emphasized for example by Entwistle (1998) rather than on the framework of the learning environment itself. In this thesis, the learning environment is seen to consist of the practices of teaching, learning and assessment as well as the physical learning environment. Fraser (1998a) defined learning environments as “social, psychological and pedagogical contexts in which learning occurs and which affect student achievement
and attitudes” (p 3.). The learning environment also includes knowledge practices, which refer to personal and social practices of working with knowledge and learning. The use of technologies, the role of collaboration and the nature of learning situation are all part of the learning environment, whether the goal is routine learning or pursuit of novelty and advancement or reworking of knowledge (Hakkarainen, 2009). At the core of these definitions is an understanding of the learning environment as very close to the learner, and individual factors such as motivation, approaches to learning, expectations and values are intertwined with the environmental aspects.

An effective learning environment as described by Biggs and Tang (2011) is one in which “Students should be required to build on what they already know, to be relevantly active, to receive formative feedback and to be engaged in monitoring and reflecting on their own learning” (p. 91). Thus, an optimal learning environment would combine engagement and a positive emotional response to make learning both enjoyable and challenging (Dunlap & Grabinger, 1996; Shernoff, 2012). In other words, students should be engaged, challenged, given adequate support and encouraged to use higher level processing of the learning material.

An important aspect of how students operate in any learning environment is the emphasis on regulation of the learning process. On the one hand, a self-regulated student sets goals for him- or herself, uses strategies such as time management, arranges a noise free study situation for attaining these goals and afterwards evaluates appropriateness of the results and used methods (Vermunt, 1998; Zimmerman, 2002). On the other hand, the learning environment is designed to support the learning process. Teachers support learning by giving examples, planning the learning process and motivating students, but the learning environment also offers other resources, such as books and other materials, technologies that support learning and instructional strategies that are aimed to support the students’ self- or co-regulation of a learning process (Grabinger & Dunlap, 1995; Kirschner, Van Vilsteren, Hummel, & Wigman, 1997).

Building on the interplay of regulation between the teacher-regulation and student-regulation of learning, Vermunt and Verloop (1999) developed the concept of friction. While originally referring to interplay between students’ self-regulation and teachers’ external regulation of the learning processes, Lindblom-Ylänne and Lonka (1999; 2000) extended it to cover the interaction between the regulation of the learner and the learning environment as a whole. Destructive friction occurs when the learning environment is too strictly or too loosely structured in relation to the students’ self-regulation skills and therefore does not match the needs of the learner. Instead, an ideal learning environment would provide shared control, where teachers facilitate and promote learning by using student-activating and student-centred methods, in order to help all types of students develop their study strategies and self-regulatory skills. This would create constructive friction: an urge to gradually develop more and more sophisticated thinking and study skills. Such friction was found by Lindblom-Ylänne & Lonka (2000) in a student-activating psychology program.

Constructive friction and positive perceptions of the learning environment are important, because they relate to successful engagement and positive learning re-
sults. Links between effective learning, satisfaction with studying, choice over topics, and positive evaluations of teaching have been discovered in a number of investigations (Ramsden, 2005; Trigwell & Ashwin, 2006). In addition, students who report positive experiences of the learning environment tend to achieve higher grades and develop better academic skills (Lizzio, Wilson, & Simons, 2002; Trigwell, Ellis, & Han, 2012).

Students’ experiences of the learning environment are related to how they approach academic tasks. Research has confirmed relations between students’ perceptions of the learning environment, approaches to learning and learning outcomes (Struyven, Dochy, Janssens, & Gielen, 2006; Trigwell & Ashwin, 2006; Trigwell et al., 2012). In general, positive perceptions are positively related to the desirable deep approach or meaning orientation (intention to understand and search for meaning) and negatively related to the less desirable surface approach or reproduction orientation (memorizing facts without trying to understand) (Kreber, 2003; Lawless & Richardson, 2002; Richardson, 2005; Struyven et al., 2006).

In addition to approaches to learning, students’ perceptions of their academic abilities also affect their learning. Academic self-concept is formed through experiences with the learning environment and is heavily dependent on the social comparison of self to others as a frame of reference (Bong & Skaalvik, 2003; Marsh, 1987a). Academic self-concept, in addition to performance, may suffer due to exhaustion and lack of interest. Academic self-concept is related to both actual achievement (Hansford & Hattie, 1982) and well-being (Skaalvik, 1997). Higher education faculties in Finland are high-ability environments with selected student populations. Poor academic achievements in comparison to other students can be a particularly stressful experience for students, no matter what learning environments are available to them.

Thus, it appears that certain learning environments encourage understanding and use of deep level learning while others push students toward using surface level learning. The determining factor may be whether or not the student perceives the challenges of the learning environment as achievable or too great to accomplish. Experiences of a heavy workload on a course are related to using a surface approach while perceived good teaching, clear goals and more freedom in learning are related to using a deep approach (Entwistle & Ramsden, 1983; Kreber, 2003; Lizzio et al., 2002; Trigwell & Prosser, 1991). That is, those who perceive the learning environment as supportive, use desirable study habits, such as striving for improved understanding by applying and comparing ideas. Further on, experiences of a heavy workload are only very weakly related to hours of work and more to poor ratings of teaching (Kember, 2004; Kember & Leung, 2006). Eley (1992) found that students reported more surface approaches when courses emphasized formal achievement, and more deep approaches when courses were perceived as high on supportive teaching, independent learning and clear structure (see also Crawford, Gordon, Nicholas, & Prosser, 1998). It thus seems that a constructive friction encourages the use of desirable study habits and that the experience of a high workload is prone to be an indicator of destructive friction. Further on, the effective learning environment described by Biggs and Tang (2011) as keeping the
student engaged, challenged, given adequate support is not easily achieved, but should be strived for with appropriate teaching methods.

1.1.1 Varying instructional procedures

The dominant position of lecture as the prevalent method of teaching in higher education continues to be regularly confirmed (Ballantyne, Bain, & Packer, 1999; Butler, 1992). However, it has been repeatedly emphasized that lectures often fail to ensure that students learn in a meaningful and active manner and students should be given a more active role in learning (Bonwell & Sutherland, 1996; De Corte, 2000; Grabinger & Dunlap, 1995; Tynjälä, 1997). It is said that lectures may discourage students from striving for deep understanding of their subject and encourage them to use tricks and strategies to pass examinations (Ramsden, 2005). Further on, it seems that the longer undergraduate students stay at the university, the less deep and the more surface approaches they use (Entwistle & Ramsden, 1983; Gow & Kember, 1990; Watkins & Hattie, 1985). However, these kinds of results may be outdated and reflect a different learning environment than one would find in universities at present. Williams (1992) reported that the majority of first-year undergraduate students preferred more responsibility, and would take on more active roles if that were permitted. While there are also efforts to make mass lecturing more engaging (Gibbs, Habeshaw, & Habeshaw, 1987; Lonka & Ketonen, 2012), student-activating teaching methods are particularly intended to challenge students to active knowledge construction rather than knowledge acquisition and, as a consequence, to deepen student learning beyond mere reproduction.

Different pedagogic methods have been developed for giving higher education students a more active role in learning. Such methods share a common aim of engaging students in seeking and processing knowledge rather than being merely subject to the delivery of content by their teachers or lecturers. In this thesis the focus is on two activating instructional formats: Problem Based Learning (PBL) (Albanese & Mitchell, 1993; Schmidt, 1983) and inquiry-based learning (Lee, 2004). Other instructional procedures include self-directed learning, project-centred learning, competency-based education and work-based learning (Vermunt, 2007). While these methods share a common goal of increasing engagement, they differ most on whether they emphasize self- or external regulation, the role of collaboration and the nature of the assignment or area under study.

PBL is a curricular and instructional learner-centred approach that is intended to empower learners to conduct research and apply knowledge and skills to develop a viable solution to a problem given by the teacher. It is commonly used in medical education. Hmelo-Silver (2004) described PBL as an instructional method in which students learn through facilitated problem solving that centres on a complex problem that does not have a single correct answer. She noted that students work in collaborative groups to identify what they need to learn in order to solve a problem, engage in self-directed learning, apply their new knowledge to the problem and reflect on what they learned and the effectiveness of the strategies employed.

Inquiry-based learning may be defined as “an array of classroom practices that promote student learning through guided and increasingly independent investiga-
Introduction

“Introduction of complex questions and problems” (Lee, 2004). Inquiry-based settings can be categorized as structured, guided and open inquiry ranging from a structured setting in which the issue and methods are set by teachers to an open setting in which the students formulate the questions and the ways in which they are addressed (Spronken-Smith & Walker, 2010). In this thesis the focus is on an open inquiry process, known as progressive inquiry-based learning (Hakkarainen, 2003; Hakkarainen & Sintonen, 2002; Muukkonen, Lakkala, & Hakkarainen, 2005). As a learning environment, it is an ill-defined setting in which the students take responsibility for planning, executing and evaluating their own learning. Students’ own, genuine questions and their previous knowledge of the phenomena in question are a starting point for the inquiry process and the aim is to explain the phenomena in a deepening question-explanation process. Students and teachers share their expertise and build new knowledge collaboratively by using different sources of information and technological tools when fitting (Hakkarainen & Sintonen, 2002). This differs significantly when compared to the usual structure of most introductory courses. In a typical lecture the setting is systematically organized, exercises are neatly designed, and the problems that learners work on are clear and well-structured (Spiro, 1988). As such, inquiry-based learning can be argued to represent real life problem solving and knowledge construction.

PBL and inquiry-based learning have common features that combine many other student-centred methods (Loyens & Rikers, 2011; Struyven, Dochy, & Janssens, 2010; Vermunt, 2007). Both require active involvement of the students in order to construct knowledge for themselves by searching, interpreting and applying information in order to solve assignments. Both are based on collaborative learning, which means that students work together on learning tasks. Although both are based on messy and complex, real-life problems, which do not have a simple right answer, the two methods differ in their origin. PBL has its origins in medical education and is based on research on medical expertise that emphasized a hypothetical-deductive reasoning process (Hmelo-Silver, Duncan, & Chinn, 2007). The origins of Inquiry-based Learning lie in the practices of scientific inquiry that emphasize posing questions, gathering and analysing data and constructing evidence-based arguments (Hmelo-Silver et al., 2007). Therefore, the focus is on knowledge building based on solving the question under inquiry.

Effects of student-activating teaching methods

Instructional formats do not always result in the desired outcomes. In some studies active learning methods increase students’ use of deep learning and development in self-regulation skills (Case & Marshall, 2004; Sivan, Leung, Woon, & Kember, 2000; Waters & Johnston, 2004). However, the opposite is sometimes true and students end up using more surface-level strategies characterized by memorizing facts without seeking the implications of what is learned (Baeten, Dochy, & Struyven, 2008; Struyven et al., 2006). Although students’ attitudes towards deep-level learning become more favourable after a course, the students do not necessarily change their approach towards deeper levels of processing (Gijbels, Segers, & Struyf, 2008). This may be because as Vermetten et al (1999) found, an approach
to learning is rather stable over time and across courses and is not easily changed. Lonka and Ahola (1995) showed that positive learning results from the activating methods employed were evident only after several years of participating in student-activating courses. That is, those who participated in activating instruction studied more slowly during the first three years of their studies, but were more successful in the long term. Thus, it seems that in activating instruction students took time to absorb and develop effective learning skills and self-regulation.

Meta-analyses of PBL evaluation studies by Albanese and Mitchell (1993) and Vernon and Blake (1993) concluded that a problem-based approach to instruction was equal to traditional approaches in terms of conventional tests of knowledge and that students who studied using PBL exhibited better clinical problem-solving skills. However, another report on a systematic review and meta-analysis on the effectiveness of PBL used in higher education programmes for health professionals (Newman, 2003) stated that “existing overviews of the field do not provide high quality evidence with which to provide robust answers to questions about the effectiveness of PBL” (p. 5).

In addition to cognitive challenges, student-activating instructional methods may have consequences for well-being. For students, being faced with a demanding new instructional format may be initially burdening. PBL and inquiry-based learning among others require self-regulation skills and an ability to work collaboratively, which some students may not yet possess when entering higher education. This may bring about problems with well-being. During the first two years of medical school, PBL has been associated with uncertainty about faculty expectations and appropriate study behaviours, unclear curricular demands and concerns with assessment (Lewis et al., 2009; Moffat, McConnachie, Ross, & Morrison, 2004). However, no differences have been found on measures of depression between PBL and non-PBL students (Camp, Hollingsworth, Zaccaro, Cariaga-Lo, & Richards, 1994). On the other hand, PBL students have been found to be more satisfied with their learning environment and study conditions, and they reported receiving more feedback from teachers when compared to students who study in a traditional curriculum (Kiessling, Schubert, Scheffner, & Burger, 2004).

1.1.2 Varying academic disciplines

The instructional format used is likely to have an effect on students’ experiences, but as important is the discipline and the specific topic under study. Research into the internal life of the university has shown that disciplines differ from each in their characteristics. Disciplines have their own social and cultural features: i.e., norms, values, modes of interaction, life-style, pedagogical and ethical codes (Becher, 1994; Becher & Trowler, 2001; Biglan, 1973; Ylijoki, 2000). Therefore, students do not merely learn the knowledge base of the field they are studying, but they also learn to socialize into the culture of the faculty, and as such internalize the practices of the discipline.

According to Biglan (1973), academic disciplines differ in two cognitive dimensions: hard-soft and pure-applied. In hard pure sciences (e.g., physics) knowledge is cumulative and atomistic, aiming at discovering universals and explaining
phenomena. The hard applied area (e.g., medicine), by contrast, is pragmatic in nature and its goal is the mastery of the physical environment by new products and techniques. Soft pure knowledge (e.g., history) is concerned with particularities and it aims at understanding and interpreting the phenomena. Finally, the soft applied field (e.g., education) deals with functional knowledge with the aim of enhancing and improving professional practices with protocols and procedures. While medicine and teacher education are easily labelled in this classification, theology, as a soft science, has programmes with both pure (church history) and applied (practical theology) emphasis. However, even a single faculty does not constitute a unified area. Especially medicine has been called a collection of subdomains instead of a unified field (Lindblom-Yläne, Lonka, & Leskinen, 1996).

Another way of dividing educational programmes is to define those programmes that equip the student with a general degree or prepare a student for a specific professional career (Squires, 1990; Ylijoki, 2000). The general or academic degree has its point of reference in the discipline itself and it has the implicit purpose of preparing students for research. The fields under study in this thesis all fall under the professional field: theology, teacher education and medicine. A professional degree prepares students for certain occupations where most of the students go to work once they have graduated. The faculty of medicine educates physicians, the department of teacher education prepares teachers and the faculty of theology educates teachers and helps the student fulfil the necessary qualification for becoming a pastor. However, the latter also has programmes with a purely general academic focus in the study of religions.

As Becher (1994) points out, the nature of discipline also affects teaching and curriculum design. Medicine, teacher education and theology all prepare students for specific professions, which means that curriculum design in these faculties can be implemented with rather clear-cut requirements compared to a department which depends on an integrative understanding of multiple areas of expertise and requires abilities needed in a more diverse group of occupations. It appears that lecturers in science departments are more likely to prefer formal, structured approaches to teaching and assessment; in arts and social sciences, teachers endorse more flexible and individualistic methods (Ramsden, 2005). In Becher’s studies (1989, 1994) medicine along with law and engineering appeared as heavily didactic with full lecture timetables and few individual assignments. However, as shown by the cultural change resulting from widespread introduction of PBL beginning in the 1980s (Albanese & Mitchell, 1993; Schmidt, 1983) this surely does not describe medical education as a whole. The implementation of PBL also shows that many curricular characteristics, which may even be held as a definite way of learning a particular subject, can be revised. Therefore, the nature of the learning environment is only partly determined by the characteristics of the topic under study. There may be some agreement about what skills a student should acquire during an education, but the conceptions of what constitutes effective learning guides how this goal is approached. In every discipline there are multiple different ways to implement teaching of which some may be more effective than others are.

Apparently students’ reasons for studying in a particular field follow the classifications described earlier. Fields that prepare students for a specific profession are
studied more because of future work opportunities, while fields which give a more
general or academic education are studied more because of student interest in the
field (Mikkonen, Heikkilä, Ruohoniemi, & Lindblom-Ylänne, 2009; Mäkinen,
Olkinuora, & Lonka, 2004). On the other hand, Entwistle and Ramsden (1983)
reported that students in the soft social sciences are more driven by an internal
motivation, apply comprehension learning and build an overall description of the
content area, while students in the hard sciences are externally motivated and en-
gaged in operational learning characterized by relating evidence to conclusions and
steps in an argument. Thus, the latter see studying more as a means to acquire
competence for future challenges.

Although originally there was no recognition that the nature of the subject
matter affects the type of learning involved (Marton & Säljö, 1976), research has
shown that students who study the soft disciplines score higher on a deep approach
to learning than students who study the hard disciplines (Entwistle & Ramsden,
1983; Lonka & Lindblom-Ylänne, 1996). However, as Ramsden (2005) concludes
even a deep approach to learning tasks in science departments often demands an
initial concentration on detailed procedures and methods of problem solving. Con-
sequently, such procedural attention to details may be difficult to distinguish from
a surface approach, which means that the surface approach might be inadequately
defined. In contrast, in the humanities, students more commonly report a deep
approach right from the beginning of their studies. Secondly, students in humanistic
sciences may be accustomed to reflecting on their own learning, while students of
the natural sciences rely on partially automatized and hard-to-verbalize problem-
solving techniques. The humanities students may be more prone to answering in a
socially desirable manner in accordance with prevailing pedagogic discourses of
their fields. Ramsden (2005) also found that when describing the surface approach,
science students emphasize overconcentration on techniques and procedural de-
tails, whereas social science students tend to report a more vague approach over-
simplifying in reading or essay-writing, or memorising unrelated generalities in
preparing for assessment. It should be noted that both the surface approach and the
deep approach are independent scales and not opposite ends of a single scale, and it
is possible for a student to score highly on both scales simultaneously. However,
these differences indicate that the deep and surface approaches have to be under-
stood in the context in which they are realised.

Another aspect of differences between disciplines is the differences in the cur-
ricula especially at the beginning of studies. As Jehng et al. (1993) have proposed,
in the natural sciences the studied content is sequential and systematic. Prerequi-
sites are more important than they are in the social sciences. For example, it is dif-
ficult to learn computer algorithms without fluency in programming languages.
These disciplines seem to be filled with orderliness and precision from the perspec-
tive of a student. In social sciences, on the other hand, knowledge is more loosely-
deﬁned. Pre-requisites are sometimes recommended, but are not critical because
learning does not follow a prescribed order. The intellectual climate in the social
sciences is full of uncertainty and after being involved in such a learning envi-
ronment for years, students become more convinced that learning takes time to
accumulate and in-depth understanding is crucial. Therefore, the nature of know-
ledge and problems in the hard sciences has been defined as well-defined, whereas in the soft sciences it is often more un-defined (Alexander, 1992; Lonka, Joram, & Bryson, 1996).

The specific way in which perceptions of the learning environment are affected by the approaches to learning and the effect of different disciplines is still unclear. These questions will be focused on in Study IV.

1.1.3 Methods for studying a learning environment

There has been a range of methods proposed for evaluating students’ experiences of the learning environment or the quality of undergraduate programmes. These methods focus on measuring attitudes or rating behaviours are measured by focusing on how the student perceives different aspects of the learning environment. Surveys of student perceptions play a significant role in the higher education sector. Surveys have their limitations, as there may be a tendency for the assessors to form a general opinion of a course and then that opinion colours all specific ratings. Students also have shortcomings as assessors as they are not equipped to evaluate the appropriateness of the course objectives, the relevance of assignments or readings or the degree to which subject matter content was balanced and up-to-date. However, many researchers have commented on their lack of qualifications for assessment while others have concluded that students’ evaluations are among the most valid and reliable as long as they are used appropriately (Cohen, 1981; Marsh, 1987b; Ramsden, 1991). That is, independently observed classroom behaviours and student ratings of instructors and courses are positively related (Renaud & Murray, 2005). Furthermore, positive evaluations of effective teaching are related to learning results (Arthur, Bennett, Edens, & Bell, 2003). Marsh (1987b) also concludes that many aspects that have been stated as potential biases, such as the effect of workload, class size and prior subject interest are not separate from students’ perceptions of a learning environment, but an essential part of it.

Various instruments have been introduced as measures of experiences of the learning environment (Fraser, 1998b). However, most of them focus either on the activity of the teacher or teacher-centred models of education (Kolitch & Dean, 1999; McKeachie, 1997). Another group of surveys focuses on specific aspects of the faculty such as the use of the library or campus facilities (Kuh, 1999). While these kinds of surveys may prove to be useful for programme-specific improvement, they would not give useful feedback to specific departments for evaluation at the degree or programme level. Therefore, only a few student feedback questionnaires are suitable for evaluating the learning environment at a more broad level than of a single instructor or course (Kember & Leung, 2009). The development of one such measurement, the Course Experience Questionnaire (CEQ), demonstrates the move from focusing merely on experiences within the classroom setting (Ramsden, 1991) to comprehending a wider range of issues related to the learning environment (Griffin, Coates, Mcinnis, & James, 2003). This shows the changed rationale from focusing on covering all the aspects of the learning environment, which, according to Fraser (1998a), are the social, psychological and pedagogical contexts in which learning occurs.
In medical education, one widely used measurement tool is DREEM (Dundee Ready Education Environment Measure) (Miles, Swift, & Leinster, 2012; Roff et al., 1997). DREEM has been used to generate profiles of an institution’s strengths and weaknesses and to make comparative analyses of students’ perceptions of education environments both within an institution and between institutions. Although originally considered to be generic and culturally independent (Roff, 2005), DREEM has shown to have problems with internal consistency even when comparing culturally similar groups (Hammond, O’Rourke, Kelly, Bennett, & O’Flynn, 2012). This issue was taken into consideration in Study II by using Confirmatory Factor Analysis (CFA) to elaborate the construct validity of the learning environment section of another, more recent measurement, the MED NORD questionnaire (Lonka et al., 2008). The difference between these two is that DREEM focuses more on perceptions of the learning environment, teaching and atmosphere, while MED NORD measures aspects relating to student well-being and conceptions of learning. MED NORD has been comprised of different scales that measure different theoretical constructs that previously have shown good predictive value and reliability. In this study the focus was on the experiences of the learning environment (Dahlin, Joneborg, & Runeson, 2005), exhaustion (Maslach & Jackson, 1981) and lack of interest (Mäkinen & Olkinuora, 2004). The content validity and reliability of these scales have been found to be good in previous studies (Dahlin, 2007; Dahlin, Fjell, & Runeson, 2010). Exhaustion and especially lack of interest are associated with lower grades and slower study progress (Mäkinen et al., 2004), and to considerations of interrupting scientific studies among PhD students (Stubb et al., 2012) demonstrating good criterion validity. The construct validity of the learning environment measures was tested in Study II with confirmatory factor analysis.

The Experiences of Teaching and Learning questionnaire (Entwistle, McCune, & Hounsell, 2003b) was developed as part of the research project ‘Enhancing teaching-learning environments in undergraduate courses’ (the ETL project; see http://www.etl.tla.ed.ac.uk), which investigated the ways in which findings from research could be used to create a learner-centred learning environment for students. ETLQ was chosen as a method for evaluating the learning environment at the University of Helsinki, because it combines the theories behind an effective learning environment, which were relevant for the curriculum reform conducted at the University of Helsinki, such as teaching for understanding and constructive feedback given to students (Parpala, 2010). While the original ETLQ focuses on teaching and learning in a course unit or module (Entwistle & McCune, 2004), at the University of Helsinki, ETLQ was modified to cover perceptions of the teaching in students’ major subject rather than a specific course unit or module (Parpala, 2010). The instrument contains five sections, two of which were used at the University of Helsinki. The first is the Approaches to Learning and Studying inventory ALSI, which contains students’ reflections on their experiences of studying. The other section covers the students’ experiences of the teaching-learning environment provided; it was based on an analysis of existing inventories measuring students’ experiences of learning environments. Exploratory factor analysis of the ETLQ inventory has provided similar, but slightly varied factor solutions (McCune, 2003;
Parpala, 2010). The inventory has been claimed to have rather stable construct validity through several versions and across several countries (Entwistle, McCune, & Hounsell, 2003). However, interview studies have raised issues with reliability concerning students with different backgrounds (Mogashana, Case, & Marshall, 2012), and a confirmatory factor analysis has also found significant differences between Finnish and British students (Parpala, Lindblom-Ylänne, Komulainen, & Entwistle, 2013).

While the ETLQ was used to gather data about students’ perceptions in different faculties at the University of Helsinki in 2006, this was not done in the Medical faculty. Another, similar project using the MED NORD was in progress in the domain of medicine. As such, these two complement each other and together cover all the faculties in the University of Helsinki. Although at the time of data collection for the current study ETLQ was not administered in Medical faculty, it has been subsequently incorporated into the annual Learn surveys, and these have included students in all eleven faculties of the University of Helsinki (Parpala & Lindblom-Ylänne, 2012).

The two instruments presented here (MED NORD and ETLQ) are somewhat different. While MED NORD is designed to measure various aspects relating to studying and well-being in medical domains, ETLQ focuses on students’ approaches to learning and perceptions of the learning environment in different faculties. In Study II, the MED NORD was used to explore relations between medical students’ perceptions of their learning environment and engagement in their studies. In Study IV, the focus was on how perceptions of the learning environment are affected by the approaches to learning and the discipline.

The inventories described earlier help to describe how students perceive their learning environment, and have been used successfully to identify strengths and weaknesses in the teaching of a specific faculty. However, these inventories omit the fact that students’ motivations behind their studies are an important factor that directs their activities. A student equipped with appropriate learning skills may perform sub optimally, if the student does not see the learning environment as supporting his or her personal goals for learning.

1.2 Personal goals

The previous section looked at theoretical and empirical issues of how students experience their learning environment. In order to see the full picture of the students’ experience, individual motivation, which plays a key role in the interaction between the student and his or her environment, must be examined. It has been suggested that people direct their own lives as agents by setting and pursuing personal goals (Nurmi, 1993; Pintrich & Schunk, 2002). This happens in an environment of various opportunities, demands and challenges provided by the learning environment and life situation. In this thesis, motivation is viewed through the goals that people set for themselves.

Personal goals are people’s self-reported descriptions about the activities in which they are currently engaged or what they would like to achieve in the future.
In the taxonomy of goal-constructs, personal goals usually reflect rather long term and high level goals, whereas others, such as achievement goals reflect aspirations in a certain situation or environment (for review see Austin & Vancouver, 1996). Personal goals are studied with various concepts, such as “personal projects”, which are related sequences of actions intended to achieve a personal goal (Little, 1983); “personal strivings”, which characterize what a person is typically trying to do (Emmons, 1986) or “life tasks”, problems an individual is currently addressing (Cantor & Kihlstrom, 1987). One difference between these conceptualizations is that they differ in terms of the conceptual hierarchy they reference (Emmons, 1999; Salmela-Aro, 1996). Personal strivings are high level and enduring concerns in a person’s life, whereas personal projects and life tasks are more concrete and include specific actions. Although these concepts have slightly different views on goals, many characteristics combine them. First, they are all personal, because each individual generates his or her own unique list of goals. On the other hand, they involve communities, because the context in which they are pursued, such as the learning environment, is shared among different students. In addition, similar goals can be achieved in diverse ways. Compared to other goal constructs in psychology, they are somewhat abstract (Little, 1996; 2007) as they combine the levels of daily activities to longer-term ambitions. Although personal goals are not necessarily far reaching, and can also be shorter such as finishing an essay, they provide insight into peoples’ motivation of having an object, which spans multiple settings and time periods.

Personal goals reflect both personal needs and demands and the opportunities the person perceives in the environment. They may be part of a long-term engagement, which began already in childhood (Nakamura, 2001), and although some individuals pursue specific goals over long periods, goals are also defined by the context (Wentzel, 2000). In a university context on a specific course, students have to balance their own personal goals with the goals set by the teacher and the course design. In any situation people pursue multiple goals simultaneously (Ford, 1992; Shah & Kruglanski, 2000). In fact, a personal goal approach is unique, since it is possible to examine multiple goals simultaneously, whereas most goal theories stress the importance of intrinsic or mastery goals instead of extrinsic or performance goals (Elliot & Thrash, 2001; Rawsthorne & Elliot, 1999).

1.2.1 Personal Goals in emerging adulthood

According to the motivational theory of life-span development (Heckhausen, Wrosch, & Schulz, 2010), people have age-related opportunities to realize various developmental goals. The key criterion for successful development is to be able to take control of one’s environment or to change behaviours to fit the demands of the environment across different domains of life. It has been shown that focusing on goals in line with age related demands is connected with well-being in higher education (Salmela-Aro & Nurmi, 1997) as well as in other domains of life (Dietrich, Jokisaari, & Nurmi, 2012; Nurmi, 1991; Nurmi & Salmela-Aro, 2002). This adaptive behaviour is especially important in life transitions in new environments, such as beginning an educational programme (Salmela-Aro & Nurmi, 1997), progress-
ing from one stage of studying to another or moving to work-life (Dietrich et al., 2012; Nurmi & Salmela-Aro, 2002), where personal goals play an especially important role.

Students in Finland begin their studies on average at the age of 21 and the average length of studies is 7.5 years. This is the time of emerging adulthood (between the ages of 18 and 25), when young people explore their potential in a variety of areas, such as education, work and love (Arnett, 2000; 2004). The early years at the university include adaptation to a student role and building a relationship with study mates, whereas when studies progress, the importance of education- and friendship related goals decreases and the significance of work and family-related goals increases (Salmela-Aro, Aunola, & Nurmi, 2007).

The path to a Master’s degree is filled with goals, which form a hierarchical structure of higher-level goals (e.g., Graduate as a Master of science) and sub-goals (pass an exam) (Chulef, 2001; Ford, 1992). In addition to study-related goals, students also have goals outside the university, such as those relating to hobbies and family. The multiple goals a person has may be in line which each other, which is suitable for achieving them, or they can conflict with one another, which in an academic environment may be harmful for achieving them (Wentzel, 1991; Wentzel, 1989). Experience of achieving important goals (commitment to goals, attainability of goals and progress in goal achievement) is connected with well-being among university students (Brunstein, 1993; Salmela-Aro & Nurmi, 1997).

1.2.2 Goals and academic achievement

Studies focusing on high school students have revealed that obtaining good grades is related to appraising goals, such as being dependable and responsible, understanding content and doing one’s very best as important (Wentzel, 2000; Wentzel, 1989). Furthermore, valuing study-related goals (Parsons, Adler, & Meece, 1984), and especially perceived competence in achieving them (Schunk, 1990), is related to obtaining good grades. Elliot, McGregor, and Gable (1999) reported that having goals focusing on performance and avoidance was associated with lower examination grades among high school students. On the other hand, goals focusing on learning were associated with deep-level processing, persistence and high effort, which in turn also led to higher examination scores. Many other studies support these findings (for review see Austin & Vancouver, 1996; Covington, 2000). Although stress is often perceived as negative for achieving goals (Nurmi, Salmela-Aro, & Aunola, 2009; Salmela-Aro & Nurmi, 1997), it may also be beneficial. A longitudinal study by Dietrich, Jokisaari and Nurmi (2012) revealed that for those individuals who initially experienced elevated stress levels concerning their work-related goals, pursuing work goals remained highly important two years after graduation, whereas for others work goal importance declined.

Studies focusing on university students have also revealed connections between goals and progress in studies. Lieberman and Remedios (2007) found that, when university students advance in their studies, they become more concerned with their grades and expect less enjoyment and learning. However, it appears that clear goals help students remain committed when studies progress even though
interest in the study subject might diminish (Mikkonen, Ruohoniemi, & Lindblom-Ylänne, 2013). Therefore, focusing on goal setting with students experiencing academic difficulty may help in improving academic performance (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010).

Unfortunately, only a few studies so far have shed light on how study-related personal goals reported by students are related to academic success in the long run. Salmela-Aro and Nurmi (1997) showed that perceived capability, accomplishment and low stress concerning goals were connected to obtaining good grades six months after the goals were reported, and also to the number of courses the students managed to pass during their first year of studying. Positive success expectations predicted academic achievement (Nurmi, Aunola, Salmela-Aro, & Lindroos, 2003). In another study, university students who tended to procrastinate and avoid challenges evaluated their personal projects as more stressful and difficult than those who did not suffer from procrastination (Blunt & Pychyl, 2005). University is a more open environment and less structured environment than high school and other earlier educational stages. The interaction between the learners can either generate a positive cycle in which positive outcomes nourish achievements or a negative one, where expectations feed sub-optimal success. It is, therefore, important to see how students’ goals relate to how well they progress in their studies.

1.2.3 Methods for studying personal goals

As an analytic unit, personal goals are comparable, as goals can be evaluated and compared between individuals according to different dimensions, such as importance, commitment or capability to achieve. Personal goals are usually analysed by asking individuals to provide a list of their goals, and then to select a subset on which they will focus, and rate each of these selected goals on a set of dimensions. Although goals are also studied with interviews (de Kleijn, Meijer, Brekelmans, & Pilot, 2012; Mikkonen et al., 2013), most studies are done with questionnaires. The personal goals approach is not a unified method, but rather a rationale, which can be studied in multiple ways. Personal goals are peculiar in at least two different ways. Firstly, although personal goals have been studied extensively, there is no fixed measurement or questionnaire, nor is it even striven for (Little, 2005). As such, study of personal goals differs from many other psychological constructs where standardization is sought and pursued. The method changes from study to study and although used sections have a common basis (Little, 1993; Little, 1983), the dimensions are modular and adaptable. New components can be integrated to explore whether they will provide what the researcher planned them to provide. As a result, psychometric properties, such as construct validity and predictive utility must be taken into consideration separately in each study. Secondly, de-standardization of some components is favoured in order to allow participants to report personally relevant and representative goals (Little & Gee, 2007). Thereafter, some of the participants do not necessarily report goals that concern the focus of the study (for example family- or achievement-related goals) and this can be perceived as an indicator by the researcher (Salmela-Aro et al., 2007; Salmela-Aro & Nurmi, 1997). In fact, sometimes this results in having to drop some partici-
pants, because they have not listed goals focusing on the category, which is the focus of the current study (Salmela-Aro & Nurmi, 1997). Another approach, which was also chosen in Study I, is to ask participants to list goals focusing on a specific area, such as education, work or relationship (Dietrich et al., 2012). A third option is to analyse all goals as equal regardless of their content (Brunstein, 1993). The progress of goals can thereafter be analysed with a follow-up setting (Harlow & Cantor, 1994; Sheldon & Houser-Marko, 2001).

**Goal contents**

A number of attempts to find a comprehensive taxonomy of human goals can be found (Austin & Vancouver, 1996; Chulef, 2001; Ford, 1992; Wicker, Lambert, Richardson, & Kahler, 1984). The number of suggested categories varies from Freud’s (1920) two (life and death instincts) to Maslow’s (1970) five levels of needs all the way to the 56 general goals suggested by Wicker et al. (1984). However, to this date there has been little progress in finding a common ground for a comprehensive classification. In line with the modular nature of analysing personal goals, the researcher is faced with the decision to either choose a previously used categorization or provide a novel perspective based on the researchers ambitions. Usually the list of goals provided by the participant is content analysed by giving each a broad category of three to four, such as self, achievement or family (Nurmi et al., 2009; Salmela-Aro & Nurmi, 1997; Salmela-Aro & Nurmi, 1997) or a more narrow label of ten to twenty categories (Little, 1983; Salmela-Aro et al., 2007).

The contents of study-related goals have been studied in terms of achievement goals, which focus on orientation in an achievement situation. Such goals have been divided into categories depending on whether the focus is on performing well in the eyes of others, or on mastering a task (Ames, 1992). Another distinction is made between goals that focus on performance or avoidance (Elliot et al., 1999; Pintrich, 2000). Although these classifications are usable in achievement situations and in the shorter term, other dimensions are needed for classifying university students’ personal goals covering a longer period. If a university student is asked about his or her most important study goal, the answer rarely hints at avoidance. It might be more relevant to ask to what extent the goals include aspects of working life, study success or learning itself, and whether they are in line with the requirements of the study programme. Study orientation (Mäkinen et al., 2004) may bring out an important aspect of reflecting on goal contents, as they reflect the general meaning students give to their studies.

**Goal appraisal**

Usually after the list of goals has been generated, they are thereafter evaluated according to different dimensions. The possibilities are either to ask the participant to evaluate three to ten important or current projects (Little, 1993; Little, 1983; Salmela-Aro & Nurmi, 1997; Salmela-Aro & Nurmi, 1997) or to focus on personal goals focusing on a specific topic, such as occupation or education (Dietrich et al., 2012; Nurmi & Salmela-Aro, 2002). The evaluated dimensions usually include such themes as meaning, structure, community, efficacy and stress (Little, 1989).
In addition to these, different ad hoc dimensions can be used according to the goals of the researcher (Little & Gee, 2007). The use of dimensions developed for a certain study requires the researcher to study the structure of the dimensions with a factor analysis and an emphasis on reliability.

While perceptions of the learning environment reflect the learner’s relation with his or her surroundings, and goals represent the motivational strivings of the student, something is missing if one does not consider the experiences that take place at the learning situations. Frustrations, the joy of success and other emotional experiences are all integral parts of the learning process. Cognitive views on motivation propose that individuals’ experiences in a situation, such as emotions, influence motivation, and hence goals (Pintrich & Schunk, 2002). In addition to emotions affecting goals, goals also influence students’ emotions and both goals and emotions influence students’ academic performance (Pekrun, Elliot, & Maier, 2009; Pekrun et al., 2007); there seems to be a reciprocal relationship between goals and emotions. Positive emotions encourage setting goals focusing on learning and these in turn have an effect on emotions in learning situations (Putwain, Larkin, & Sander, 2013). Lonka et al. (2004) outline a perspective into studying higher education with three levels of context: general, course-specific and situational. While perceptions of the learning environment and goals may be defined and studied as either general or course specific, emotional experiences take place in the learning situation. Emotions need to be studied at the environment in which they take place although they are closely related to motivation and perceptions of the environment (Pekrun, 2006).

### 1.3 Emotional experiences

Whereas perceptions of the learning environment reflect students’ cognitive relationship with surroundings and goals describe their aspirations, emotional experiences reveal a different kind of view on what students undergo during their studies. Research had for a long period focused on mere cognitive constructs and neglected emotions, the two exceptions being test anxiety (Zeidner, 1998) and attribution theory (Weiner, 1985). However, the modern view is that cognitive functions and emotions can be seen as two ends of a continuum rather than as dichotomous (Russell, 2003) and emotions can contribute much to educational research (Schutz & Pekrun, 2007). In an open-ended setting in which the participants listed emotions they experienced in higher education, students reported virtually the whole spectrum of human emotion: enjoyment, hope, pride, anger, frustration and boredom were those most frequently mentioned (Pekrun et al., 2002). It thus seems that emotions are ever-present in academic settings.

In this dissertation the focus is on self-reported emotions. Emotions as a whole are multifaceted phenomena, which involve affective, cognitive, physiological, motivational and expressive components (Barrett, Mesquita, Ochsner, & Gross, 2007). For example, a student’s anxiety before an exam can include uneasy feelings, cognitive worries about failing the test, a physiological increase in heart rate, a motivational urge to escape the situation and an anxious facial expression. Moti-
vation is an integral part of what emotions a particular situation raises. According to Lazarus (1991), emotions are based on evaluations of a situation and they are an important part of how people strive for their personal goals. If a situation has no relevance concerning one’s own goals, the emotional experience includes probably frustration or boredom. When the situation touches one’s important personal goals, the likelihood of the emotional experience becoming more positive and intensive increases. The congruence between the situation and a personal goal, that is if the situation is perceived as supporting the goal, would provoke positive emotions, whereas incongruence would rouse a negative emotional experience.

In this dissertation, emotions are categorized into two main dimensions: positive and negative affects, which have been found to be the first two factors of different affect measures in a number of studies with self-reported emotions (Watson & Tellegen, 1985). According to Watson et al. (1988), a high positive affect means an energetic state, full of concentration and pleasurable engagement, whereas a low positive affect is characterized by sadness and weariness. On the other hand, a high negative affect is a general dimension of subjective distress, such as anger, fear, and nervousness, with a low negative affect being a state of calmness and serenity. Alongside positive and negative affect, other dimensions describing emotions are valence and activation (Feldman Barrett & Russell, 1998). In terms of valence, pleasant states, such as enjoyment and happiness, can be differentiated from unpleasant states, such as anger, anxiety or boredom. In terms of activation, physiologically activating states can be distinguished from deactivating states, such as activating excitement versus deactivating relaxation.

Both these classifications of positive and negative affects and valence and activation are orthogonal; that is, they form a two-dimensional space in which affective states can be organized. Although these two may seem different, Figure 1 describes how they are actually rotations of the same coordinates and different views into the same classification, which can be transformed from one to the other (Barrett & Russell, 1999; Inkinen et al., 2013; Yik, 1999). That is, a high positive affect, such as enthusiasm is a state of high valence and high activation. Agreement upon these core dimensions seems rather unanimous (Yik, Russell, & Steiger, 2011).
In addition to valence and activation mentioned earlier, control value theory complements the view on emotions with whether they focus on the activity itself (e.g., enjoyment or frustration experienced during learning) or on outcomes of the activity (joy or pride of completed academic goals). Control value theory focuses specifically on achievement emotions, which are emotions tied directly to achievement activities or outcomes (Pekrun, 2000; 2006; Pekrun et al., 2007). In this view, emotions are considered to form in relation to the value or subjective importance of a task and whether one feels in control of or out of control of the success or failure of the result. These in turn are affected by the goals set by an individual.

1.3.1 Emotions in an academic environment

Linnenbrink and Pintrich (2004) examined how positive affective experiences during an instructional unit related to achievement at the end of the unit. Surprisingly, it was found that the more positive affective experiences were perceived to be, the worse was the achievement. The authors suspected that a reason for this might lie in the fact that due to the utilisation of cognitive resources, positive affective experiences had an unfavourable influence on the processing of information. However, it should be noted that the measuring instrument Linnenbrink and Pintrich (2004) used did not take into consideration the arousal level of the positive affect, that is whether the experience was active or serene.

In most studies activating positive affects, such as enjoyment of learning have had an advantageous effect on the activation and use of cognitive resources (Buff, Reussler, Rakoczy, & Pauli, 2011; Pekrun, 2006). It appears that enjoyment directs attention towards the task and reduces task-irrelevant thinking. Moreover, positive affects are seen as increasing students motivation and persistence and can be beneficial for students’ learning and pursuit of challenging academic goals (Ainley et
al., 2005; Efklides & Petkaki, 2005; Pekrun, Götz, Titz, & Perry, 2002; Pekrun et al., 2002; Ruthig et al., 2008). However, it should also be noted that more deactivating positive experiences such as serenity and stillness can also have an impact on cognitive resources. They can lead to cognitions that are not directly focused on the object of learning. This is linked to a reduction of task-related attention (Pekrun, 2006), and in turn may have a negative impact on learning and achievement.

While the favourable effects of activating positive affects seem clear, negative emotions appear to direct attention away from learning and towards the emotion itself (Meinhardt & Pekrun, 2003) Deactivating negative emotions, such as boredom or hopelessness are related to lower motivation, a less elaborated approach to learning, more irrelevant thinking, lower self-regulation and lower academic achievement (Ellis & Ashbrook, 1988; Pekrun et al., 2002). The effect of activating negative affects, such as anxiety or anger, is twofold. For example, although failure related anxiety may reduce interest, flexible strategy use and attention resources, it may also strengthen motivation to enhance effort and avoid failure (Derakshan & Eysenck, 2009; Eysenck, Derakshan, Santos, & Calvo, 2007; Meinhardt & Pekrun, 2003). Similar results have been acquired with anxiety in test situations (Zeidner, 1998). Anger, on the other hand, has been shown to relate to a strong will to overcome obstacles (Bandura & Cervone, 1983).

Achievement emotions appear to be strongly domain-specific (Goetz, Frenzel, Pekrun, & Hall, 2006; Goetz, Pekrun, Hall, & Haag, 2006). That is, certain emotions such as enjoyment and boredom are experienced repeatedly in certain types of learning environments. Lectures and traditional teaching, in which the teacher is the centre of control, can be expected to be rather peaceful in terms of experienced emotions (Muukkonen et al., 2008). In collaborative learning, many challenges, such as shared knowledge construction and social conflicts, are typically higher than in conventional learning situations, because the students are required to take responsibility for the groups’ functioning in addition to their own learning. Multiple factors, such as conflicting goals between group members (Ainley, 2007; Volet & Mansfield, 2006) or lack of cohesion in a group (Mäkitalo, Häkkinen, Leinonen, & Järvelä, 2002; Van den Bossche, Gijselaers, Segers, & Kirschner, 2006) may cause challenges and obstacles that cause intense emotions.

While emotions are experienced individually, in collaborative group work they are mutually constructed and regulated. Järvenoja and Järvelä (Järvenoja & Järvelä, 2009) found that students used different forms of regulation, such as shifting focus from personal goals to solving collaborative challenges to maintain productive group work. In addition to changing one’s own activity to fit the group’s actions, students also took measures to modify the group’s actions. Failure to maintain a balanced atmosphere and to solve conflicts may lead to lower task-engagement and push participants to avoid emotionally unpleasant situations at the expense of learning (Näykki, Järvelä, Kirschner, & Järvenoja, 2014). The experience may also be different for different group members. Eteläpelto et al. (2005) found that for those who considered themselves to be highly involved, the group was a source for motivation and positive emotional experience, whereas those who reported more marginal participation found the learning experience to be emotionally very negative. Emotions also have an effect on group dynamics. Positive af-
Effects have been associated with positive group interaction while negative affects may result in withdrawal from participation or group discussion (Do & Schallert, 2004; Linnenbrink-Garcia, Rogat, & Koskey, 2011).

Many collaborative arrangements present the student with a new kind of setting in which the student has to evaluate whether or not his or her goals are supported. Emotional experiences change from moment to moment, as the situation unfolds in line with a person’s short-term and long term goals (Boekaerts, 2007). Creating new skills and competencies is a challenging and uncertain process that involves repeated breakdowns, ruptures, and tensions because of a lack of established procedures. In a new kind of learning situation, it may be hard to conceive how personal goals can be achieved via the novel learning methods. From a student’s point of view, new instructional formats may be perceived as a threat and this would cause negative emotions. Moreover, these negative emotions would limit flexible strategy use and attention resources. Miceli and Castelfranchi (2005) suggest that anxiety is a result of an epistemic uncertainty about whether a feared threat will come through. When this uncertainty ends, even in a negative certainty, anxiety should be reduced accordingly.

1.3.2 Challenge/Competence

In study situations, emotions are often based on the balance between the challenges the situation presents on the one hand, and learners’ feelings of competence on the other. There seems to be a rather systematic link between challenge, competence and emotions: the more challenging the situation, the more active the emotions seem to be, whereas the more competent one feels, the more positive emotions are experienced (Inkinen et al., 2013; Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003). On the other hand, the relationship between challenge and enjoyment is unclear. While challenge has been associated with enjoyment and other positive affects (Abuhamdeh & Csikszentmihalyi, 2012; Haworth & Evans, 1995), in some studies the relation is negative (Clarke & Haworth, 1994). It may very well be that the relation between challenge and emotions depends on how competent the student experiences him- or herself.

Moneta and Csikszentmihalyi (1996) found that high levels of feeling challenged and competent were positively related to concentration and involvement. Furthermore, high-challenge and high-competence situations are far more salient and intense compared to medium-level experiences (Moneta & Csikszentmihalyi, 1999). Such situations, accompanied by a sufficient experience of competence are likely to engender full concentration and absorption, which can also be referred to as a flow experience (Csikszentmihalyi, 1988). Flow states have been described in such activities as making music, rock climbing, dancing, sailing and chess (Csikszentmihalyi, 1990). Csikszentmihalyi (1990) argued that “The best moments usually occur when a person’s body or mind is stretched to its limits in a voluntary effort to accomplish something difficult or worthwhile” (p. 3). In educational settings these kinds of circumstances are more likely to occur in individual or group work, which are also experienced as more challenging versus listening to lectures or taking exams (Muukkonen et al., 2008; Shernoff et al., 2003).
Moneta and Csikszentmihalyi (1996) discovered that an imbalance between the two, that is, if the task is perceived as too easy or too challenging, often leads to a decrease in concentration and involvement. If the challenges are too low, the individual loses interest. If the challenges are too high, the individual feels a lack of control over the environment and becomes anxious and frustrated. There is a threat that the student may give up and end up avoiding the challenge. An optimal relation between challenge and competence is also related to effective learning. If a task is perceived as too easy or too challenging, learning results may suffer (Pearce, Ainley, & Howard, 2005). However, Moneta and Csikszentmihalyi also showed that situations in which the challenge is slightly too high, are better for concentration (Moneta & Csikszentmihalyi, 1999). It should be noted that learning and the experience of learning is a dynamic process. Therefore, the balance between challenge and competence also oscillates and an optimal learning process would provide situations that offer different levels of challenge.

In conclusion, it appears that intense, affect-provoking and challenging situations are likely to focus the learner’s attention. Enjoyment is an important aspect of an engaging learning experience. If studying offers merely excessive challenges, it may cause frustration and a loss of concentration. In this thesis, the focus was on how varying instructional formats may promote different experiences in terms of affects and feelings of being challenged and competent. Of particular interest was how students would experience shifting from a teacher-centred setting to a learner-centred, inquiry-based instructional format, which also was more ill-defined.

1.3.3 Methods for studying emotional experiences

Experiences of the learning environment are retrospective generalizations of how a student sees his or her interaction with the surroundings and personal goals reflect a student’s orientation towards future possibilities. Goals and dispositions may also guide what kinds of emotions are triggered (Ketonen & Lonka, 2013), but emotional experiences take place in the present, at a specific context and time, and they change accordingly. A great part of research focusing on emotions has been conducted either in laboratory settings using deductive, quantitative and experimental approaches (Ainley et al., 2005; Mello, Clarridge, & Studdert, 2005; Schutz & DeCuir, 2002). In many studies the participants are exposed to either positive or negative emotional experiences and results for cognitive or academic tasks are thereafter studied (Efklides & Petkaki, 2005; Meinhardt & Pekrun, 2003). While these methods give rather accurate results of the effects of different emotions, they do not shed light on how emotions appear and are experienced in learning situations. Experiences do leave a memory trace and many studies ask participants to list emotions they have felt during “the past few days” (Brunstein, 1993; Buff et al., 2011) or how they usually feel in a specific situation (Goetz et al., 2006; Putwain et al., 2013; Ruthig et al., 2008). However, people tend to use their current experiences as a basis for reconstructing past experiences, and this brings about a bias between recalling how and experience felt and what the actual experience was (Shiffman, 2000; Stone, Shiffman, Atienza, & Nebeling, 2007). Therefore, the current affective state often colours the past.
Many studies shorten the time between a learning or test period and the questionnaire by distributing questionnaires immediately after the activity (Järvenoja & Järvelä, 2009; Linnenbrink-Garcia et al., 2011) or they combine different qualitative and quantitative methods (Buff et al., 2011; Do & Schallert, 2004). As no single category of method is suited to answer all questions, a wide variety of approaches should be encompassed to capture the richness of emotions in educational settings. However, very few studies have managed to study emotions in real life settings during the actual learning activities. Pekrun and Schutz (2007) emphasize the need for experiments in field settings and educational intervention research targeting emotions.

Everyday experience methods are approaches where the participants are asked about an ongoing activity in their natural environment (Greenwald & Banaji, 1995; Ross, 1989; Shiffman, 2000). The participant is usually signalled to complete a short questionnaire about his or her current experience. These methods are also referred to as Ecological Momentary Assessment (EMA) (Stone et al., 2007) or Experience Sampling Method (ESM) (Csikszentmihalyi & Larson, 1987). Although they are a form of self-report, they lack many of the shortcomings of traditional methods (Barrett & Barrett, 2001; Reis & Gable, 2000). They do not rely on memory, a need for aggregating one’s usual feelings or an artificial context. Instead participants are asked to provide descriptions of their current thoughts, feelings, and behaviours in the situations they encounter in their daily lives, thereby allowing researchers to sample a range of variables in different environments. Bringing the instrument into the actual activity offers an accurate and multifaceted portrait of experience in its natural context. However, the complexity of the situation and the difficulty to interpret observations may result in loss of construct validity. That is, it is difficult to say whether a measurement in a study situation measures emotions related to the learning task at hand or to an argument with a friend an hour earlier. Therefore, causal conclusions should be made only after articulating and ruling out possible explanations for results (West & Hepworth, 1991). On the other hand, the possibility to aggregate across multiple occasions and contexts reduces other forms of bias, such as retrospective bias and the need to aggregate across multiple situations (Epstein, 1979). Everyday experience methods allow one to acquire knowledge not easily obtained with other techniques. They are a promising way to complement standard research strategies.

When studying everyday experiences, researchers have used different instruments (for review see Bolger, Davis, & Rafaeli, 2003), such as telephone interviews at the end of each day (Almeida, 2007), diaries using pen and paper (Almeida, Wethington, & Chandler, 1999), which may be accompanied with a timed beeper to alarm one to complete a questionnaire (Csikszentmihalyi & Larson, 1987; Fave & Massimin, 2005; Moneta & Csikszentmihalyi, 1999). However, pen and paper methods are easy to fake by completing the diary after the fact (Shiffman, 2000). Fortunately, mobile devices offer a convenient way to carry out the measurement. Mobile devices are especially promising, because they offer several major advantages: time can be recorded to verify compliance with the sampling scheme and data can be uploaded automatically (Barrett & Barrett, 2001). In Study III, participants’ learning experiences were collected with the Contextual Activity
Sampling System (CASS) (Muukkonen et al., 2007; 2008). This research instrument has been designed to collect frequent and systematic data on ongoing educational and professional activities. The CASS Query tool is a Java application that runs on 3G mobile phones with a Symbian operating system. It sends queries to participants’ mobile phones, after which the answers are sent to a server database.

Reis and Gable (2000) conclude that there are three general purposes that can be used for everyday experience studies: establishing the commonness or qualities of a phenomena, testing a theoretically generated hypothesis, and serving as a discovery technique. In Study III, which focused on student teachers’ experiences on two two-week periods, all of these goals were pursued. The frequency of situations in which students were studying was compared during two different study periods (lecture-based and inquiry-based period). A hypothesis that students’ emotional experiences would differ during the two periods was tested. Thirdly, a time series analysis aggregating emotional experiences at a group level was used to follow and explore the student group’s process.

Experience sampling can occur at regular intervals (interval contingent), in response to events of interest (event contingent), or randomly throughout the day (signal contingent), which are the three possibilities for sampling strategies (Wheeler & Reis, 1991). In interval contingent recording, participants report their experiences at regular, predetermined intervals. These may be at the end of each day or every four hours. In signal contingent recording, a signal or a vibration from an electronic device prompts the participant to describe current activity at a random or a fixed schedule. In event-contingent recording, participants report whenever a predetermined event has occurred, such as lying or smoking. The selection of a protocol is made based on a research goal and the nature of the phenomenon under study. In Study III, a signal contingent protocol with a three-hour fixed interval was used. This made it possible to compare different domains of activity and mental states during different activities.

The multifaceted nature of everyday experience data lends itself well to sophisticated methods, such as multilevel modelling or within-person regressions (Inkinen et al., 2013; Tolvanen et al., 2011; West & Hepworth, 1991). The many levels include such aspects as the day of week, time of day, place, activity and participant’s milieu. Reis and Gable (2000) suggest taking into consideration at least two levels: aggregating across different situations, such as work or leisure and taking into consideration between-person variability. In Study III, this was accomplished by differentiating between those situations in which the participants were studying or when they were not. Moreover, the between-person variability was controlled by standardising observations on a within-person level in order to eliminate differences in answer tendencies when making a group level analysis. Although time and temporal issues are present in everyday data sets, they are rarely addressed explicitly (Reis & Gable, 2000). West and Hepworth (1991) list different strategies for contending with and identifying serial dependency, such as analysing developmental trends or cyclical mood changes during weekdays. In Study III, a simple group level aggregation of data with a temporal sliding mean was used to create a figure accompanied with identifying instances where the students were working collaboratively.
Reis and Gable (Reis & Gable, 2000) emphasized, that when using everyday experience methods the researcher should be careful with the accuracy of the data. The data must be inspected thoroughly and the investigator should rely on multiple strategies before making conclusions. Special focus should be paid on outliers, heteroscedasticity, correlated errors and univariate and multivariate distributions and descriptions of the data handling (Stone & Shiffman, 2002).

Overall, everyday experience methods offer a promising way to supplement traditional research methods or to open new lines of inquiry. In addition to presenting challenges for data analysis, collecting the data is also resource intensive and technical.

1.4 Summary

In the previous sections, the experience of studying was conceptualized from three different perspectives: relationship with the learning environment, personal goals and emotional experiences. Perceptions of the environment, motivation and emotion are interconnected and represent the three levels of individual experience (Pekrun, 2006). Although closely related, they are psychologically and neurologically different and by implication should be separated for scientific purposes (Damasio, 2004). The different qualities of the three levels also have consequences for research methodologies, which were discussed at the end of each previous section. Figure 2 draws together the main theoretical perspectives in an attempt to build a possible framework for understanding the interaction between the student and the learning environment.
As shown in Figure 2, learning processes take place in a continuous interaction between the student and the learning environment. The student engages in the learning process, and has his or her individual motivations, expectations and orientations. Moreover, the student is equipped with self-regulation skills and approaches to learning, he or she has acquired in previous learning opportunities. The learning environment consists of the faculty’s physical and disciplinary setting, and the practices of teaching, learning, and assessment. Students form a cognitive relationship to the learning environment based on how they perceive their personal options in the learning environment. The motivational level is comprised of the personal goals of the student and the resources offered by the environment to strive for these goals. Emotional experiences constitute the micro-level of this interaction. Various encounters in lecture halls, libraries and other contexts provoke emotions and challenge, which may give rise to sensations, interests and frictions according to how the student experiences the learning situations. This ensemble of three levels of experiences, which mediate the interaction between the learner and the learning environment, is multifaceted. The interaction may either scaffold and support learning or lead to alienation and loss of interest. Constructive experiences should populate all three levels to make the learning process rich and productive. Therefore, methodological triangulation and an embrace of diverse research strategies
are favourable ways to cover the many aspects of the student’s experiences of the study process.

1.5 Overall aims of the research program

The main goal of this thesis is to explore how students experience their studies in different academic learning environments aiming at professional vocations. Relating to this, the second goal is to find ways to support successful engagement in studies. Following the conceptual and theoretical frameworks outlined above, this goal was approached in the four studies.

Study I explored what kinds of study-related goals theology students have at the beginning of their studies. The study investigated whether evaluations of study related personal goals at the beginning of studies predict later study success. Study II investigated medical students’ experiences of their learning environment in two different kinds of medical curricula. Study III analysed how teacher students experienced two different kinds of study periods. The focus was on situational experiences, namely emotions and experiences of competence and challenge during two different kinds of study-periods. Alongside the situational data, qualitative interview data was used. Study IV explored approaches to learning and experiences of the learning environment among undergraduates in different disciplines.

The research questions were as follows:

1. What are the components of successful and unsuccessful engagement with the learning environment?
   a. What kinds of study-related goals do students have at the beginning of their studies and how do they relate to study progress? (Study I)
   b. How are students’ experiences of their learning environment related to their well-being and academic self-concept? (Study II)

2. How do students experience different kinds of learning environments and what kinds of roles do experiences and affects have in the learning process?
   a. Lecture-based curriculum and problem-based curriculum (Study II)
   b. Lecture-based and inquiry-based learning period (Study III)

3. To what extent are experiences of the learning environment related to the features of the faculty and qualities of the student?
   a. Do students in different faculties differ in their typical approaches to learning? (Study IV)
   b. Do students with similar approaches to learning have similar experiences of their learning environment in different faculties? (Study IV)

In the following sections the methods and results of four studies are set out, then drawn together in the final, General Discussion.
2 Overview of the original studies

2.1 Study I

2.1.1 Aims

Study I examined the kinds of goals theology students have at the beginning of their studies, and examines whether these goals are related to academic achievement during their first three years at university. The first aim of this study was to see how students evaluate their goals. The second aim of this study was to examine what contents students listed for their goals, and whether those who evaluated their goals differently also varied in this respect. The third aim of this study was to examine whether students who evaluated their goals differently also varied in their academic achievement.

2.1.2 Context of the study

The Faculty of Theology includes all theological disciplines: church history; biblical studies; systematic theology; practical theology and comparative religion. At the beginning of their studies all students study common general studies; after that they choose to specialize. Many Faculty graduates are employed in the Evangelical Lutheran Church of Finland. Some become teachers in comprehensive or upper-secondary schools, while others find employment in academia, the media or other sectors of society.

2.1.3 Participants and procedure

The participants were 133 first-year students in the Faculty of Theology at the University of Helsinki. Women made up 71% of the participants, which is slightly higher than the average population at the university (62.4%) or at the faculty (63.0%). The subjects were 18–54 years old (M = 24.1, SD = 7.0). Many students in the Faculty of Theology begin their studies at an older age, and the age distribution of the respondents seemed to resemble that of the target group. All the students who began their studies at the Faculty of Theology in 2003 (n = 189) were sent a questionnaire during the third month of their first term. Of them, 133 returned the questionnaire, giving a response rate of 70.4%.

2.1.4 Materials

A modified and contextually adapted version of Little’s (1983) Personal Project Analysis inventory (PPA) was used in this study. The PPA is not a fixed questionnaire, but rather a method used in different ways in different studies (for a review see Little & Gee, 2007). The focus in this study was on study-related goals, and the questionnaire was adjusted accordingly.
In the first part of the questionnaire, the participants were asked to list four important personal projects. In the second part of the questionnaire the subjects were asked to record one goal concerning their education. After naming the project they were asked to rate it on nine dimensions using a seven-point scale ranging from (1) not at all to (7) very much. The dimensions were as follows: importance; commitment; progress; time, burden; accomplishment; capability; work and stress.

2.1.5 Statistical procedure

The data was analysed in four stages. First, an exploratory factor analysis was carried out in order to sort out the structure of the evaluations concerning the goals. Secondly, a K-means cluster analysis was conducted to see what variation there was in the evaluations of the study-related goal. Thirdly, the self-reported names of the study-related projects were classified in a data-driven manner, and a chi-square test was used to see if the contents of the goals varied in the clusters. Fourthly, one-way analyses of variance were conducted to see whether the students in different clusters varied in terms of evaluation concerning their goals and their academic achievement. Tukey’s post-hoc tests with a significance level of \( p < .05 \) were used to indicate differences between the individual groups. Effect sizes for each analysis were also calculated. The eta-square values of .01, .06 and .14 were interpreted as small, medium and large, respectively, as suggested by Cohen (1988).

2.1.6 Results

Factor analysis. The nine items concerning the evaluation of study-related projects were submitted to a maximum likelihood factor analysis with a varimax rotation specifying four factors. The first factor reflected achievement (Cronbach’s alpha \( \alpha = 0.75 \)), with strong loadings on progress, time and effort, and work. The second factor indicated stress \( \alpha = 0.89 \) and had strong loadings on burden and stress. The third reflected the capability \( \alpha = 0.80 \) to complete the goal and had strong loadings on accomplishment and capability. Finally, the fourth factor manifested the importance \( \alpha = 0.84 \) of the project, and had strong loadings on importance and commitment. Based on the factor analysis, four sum variables were created covering achievement, stress, capability and importance of the goal.

Cluster analysis. A K-means cluster analysis was conducted in order to explore the variation in the evaluations of the study-related goals. A three-cluster model was considered to best represent the variance found in the data. The characteristics of the clusters are reported in Table 1. The clusters were named according to their characteristics. Cluster 1 was called Self-fulfillers because it reflected low stress and high capability with regard to the study-related project. These students did not appear to experience their goals as stressful, and thought they were capable of achieving them. The cluster also reflected medium values on achievement. Cluster 2 was named Committed because it produced high evaluations on all the variables. These students found their study-related goals important and stressful and they felt capable of achieving them. Cluster 3 was named Non-committed, and could mostly be described in terms of low achievement and quite a high level of
stress. The students in this cluster also gave lower evaluations in terms of the importance of completing the project and of their ability to do so.

Table 1. The significance testing of the individual scales by cluster

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cluster</th>
<th>M</th>
<th>M</th>
<th>M</th>
<th>F</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance</td>
<td>C1: Self-fulfillers (N=51)</td>
<td>5.92</td>
<td></td>
<td></td>
<td></td>
<td>8.46**</td>
</tr>
<tr>
<td></td>
<td>C2: Committed (N=41)</td>
<td>6.25</td>
<td>5.51</td>
<td></td>
<td></td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>C3: Non-committed (N=41)</td>
<td></td>
<td></td>
<td>5.11</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Capability</td>
<td>C1: Self-fulfillers (N=51)</td>
<td>6.09</td>
<td></td>
<td></td>
<td></td>
<td>25.42**</td>
</tr>
<tr>
<td></td>
<td>C2: Committed (N=41)</td>
<td>6.04</td>
<td>5.01</td>
<td></td>
<td></td>
<td>.21</td>
</tr>
<tr>
<td></td>
<td>C3: Non-committed (N=41)</td>
<td></td>
<td></td>
<td>2.61</td>
<td></td>
<td>Large</td>
</tr>
<tr>
<td>Achievement</td>
<td>C1: Self-fulfillers (N=51)</td>
<td>4.76</td>
<td></td>
<td></td>
<td></td>
<td>78.21**</td>
</tr>
<tr>
<td></td>
<td>C2: Committed (N=41)</td>
<td>5.56</td>
<td>3.26</td>
<td></td>
<td></td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>C3: Non-committed (N=41)</td>
<td></td>
<td></td>
<td>4.19</td>
<td></td>
<td>Large</td>
</tr>
<tr>
<td>Stress</td>
<td>C1: Self-fulfillers (N=51)</td>
<td>3.11</td>
<td></td>
<td></td>
<td></td>
<td>93.66**</td>
</tr>
<tr>
<td></td>
<td>C2: Committed (N=41)</td>
<td>5.57</td>
<td>4.94</td>
<td></td>
<td></td>
<td>.37</td>
</tr>
<tr>
<td></td>
<td>C3: Non-committed (N=41)</td>
<td></td>
<td></td>
<td>3.84</td>
<td></td>
<td>Large</td>
</tr>
</tbody>
</table>

Note. **p<0.001

According to Tukey’s post-hoc tests (p < .05), all the differences between the individual groups were significant except on two occasions: the Self-fulfillers and the Committed students did not differ in their evaluations about the importance of the goal and their capability. As Table 1 shows, all the differences were significant, and all the effect sizes except importance were large. However, because the K-means cluster analysis maximises mean differences, this was to be expected.

The contents of the study-related goals. The focus of this study was on study-related goals and their appraisal. In the first part of the questionnaire, the participants identified four goals concerning different domains of life. Those in the Committed cluster had recorded a study-related project as their first project more often (52%) than the Self-fulfillers (21%) and the Non-committed (29%).

In the second part of the questionnaire, the participants were asked to describe one project concerning their studies, and to evaluate it according to different criteria. Because no earlier studies using this kind of classification could be found, we named these study-related projects in accordance with the data. We then identified 10 clearly separable groups of goals, which were combined into four categories as follows. The Qualification category consisted of goals concerning graduation (to graduate as a Master of Theology), and working as a priest (Ordination) or as a teacher (to become a qualified teacher). The Study process category included goals concerning studying and the learning process (to learn how to study, study nicely and enjoy it), learning contents (learning to know the Bible better) and student exchange (study abroad in Namibia). The Study success category consisted of goals concerning progress with the studies (to get 20–25 credits during the first term), and balancing studies and family life (to fit in studies and the family). The last category was named Other than theology, and consisted of goals related to other fields of study (to be accepted to study education and history) or uncertainty about the adequacy of the subject (to find out whether or not theology suits me).
Another assessor classified all the goals in the four categories according to this classification. The content-analysis reliability measured with the percentage rate of agreement between the two independent raters was 91%. This rate of agreement gives a Cohen’s kappa (Cohen, 1960) of 0.88, which could be considered an excellent level of agreement (Fleiss, 1981). In the cases where the two raters disagreed, the selections of the first rater were used.

Following the formation of the four categories an analysis was conducted in order to determine whether students in the different clusters reported different kinds of contents for their goals. As Table 2 shows, there was variation in goal content ($\chi^2 = 19.87$, df = 6, $p = .003$). The Committed group mostly reported goals related to qualifications or study success, while the Self-fulfillers reported goals concerning the study process. Moreover, the Non-committed group had more goals related to fields outside of theology.

**Table 2. Study-related goals by cluster**

<table>
<thead>
<tr>
<th>Category</th>
<th>Self-fulfillers %</th>
<th>Committed %</th>
<th>Non-committed %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualifications</td>
<td>23</td>
<td>40</td>
<td>26</td>
</tr>
<tr>
<td>Study process</td>
<td>43</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>Study success</td>
<td>30</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>Other than theology</td>
<td>4</td>
<td>10</td>
<td>17</td>
</tr>
</tbody>
</table>

**Academic achievement.** The clusters were also compared to see whether the students varied in terms of academic achievement. The results are shown in 3. No differences were found in grade averages, but there were differences in the number of study credits. The students in the different clusters differed according to the number of credits awarded cumulatively after one (F = 3.84, $p = .024$, $\eta^2 = 0.05$), two (F = 3.74, $p = 0.026$, $\eta^2 = 0.05$) and three years (F = 3.21, $p = .044$, $\eta^2 = 0.04$) of studying. A Tukey’s post-hoc test revealed that there was no significant difference between any two of the groups after the first year: at this point the mean difference (MD) between the Committed and the Non-committed was 8.55. After the second and third years, however, the differences were statistically significant: the Committed students had achieved more credits than the non-committed after the second (MD = 19.81) and third years (MD = 18.03).
2.1.7 Discussion

The main finding of this study was that the participants differed in how they evaluated their goals in the beginning of their studies and that this was related to their academic achievement in the long run. Although they all evaluated their goals as important, there were substantial differences in terms of the ability to achieve them, progress made thus far and the level of stress involved.

There were some methodological limitations in this study. First, only one goal from each participant was identified, and the results reflect the goals that were perceived as most important. Therefore, there is not a comprehensive picture of the full range of personal goals. The sample size was relatively small, consisting only of theology students. Secondly, it may be suggested that the clusters merely indicate a difference in response tendency. Students in the Committed cluster gave higher evaluations on all variables than the Non-committed did, for example. This counterargument may be revoked, because the use of qualitative analysis together with quantitative methods also revealed variation in the self-reported contents of goals in the different clusters. In addition, the longitudinal setting of the study showed differences in study success, which reflected the differences in commitment to studying in the clusters.

In the second study we focused on how students see their learning environment and whether this relates to their well-being.
2.2 Study II

2.2.1 Aims

The first goal of the study was to investigate medical students’ perceptions of their learning environment (i.e., worry about future workload, satisfaction, disengagement, workload and feedback), how these relate to students’ well-being (i.e., exhaustion and lack of interest) among medical students, and how these, in turn, relate to students’ academic self-concept. Based on previous research (Dahlin et al., 2010), it was hypothesized that the perception of worry would positively relate to exhaustion, while satisfaction with the learning environment would negatively relate to it. In addition, it was hypothesized that lack of interest would negatively relate to academic self-concept, since previous research has established this relationship (Skaalvik, 1997).

The second goal of the study was to compare students’ perceptions of their learning environment, exhaustion, lack of interest, and academic self-concept in PBL and LBL curricula and during different phases of medical education (pre-clinical and post-clinical). Based on previous research (Kiessling et al., 2004; Lewis et al., 2009; Moffat et al., 2004), it was hypothesized that novice students report more workload and exhaustion in the PBL environment. On the other hand, it was also anticipated that students in the PBL environment would report to receive more feedback, as a perception of their learning environment.

2.2.2 Context of the study

The study was carried out in three medical faculties in Finland. Medical education in Finland takes place in five universities and is six years in duration. Entry to the faculty is through an entrance examination. From those who take part in the examination, about 10–15% are admitted; therefore, the students constitute a highly selected group.

2.2.3 Participants and procedure

The participants were 610 medical students (69% male, 31% female) from three medical faculties in Finland. The mean age was 23.2 years \((SD = 3.1)\). The first \((n = 194)\) and the second medical school \((n = 240)\) have a lecture-based (LBL) curriculum. Of the students in the LBL medical schools, 251 were in the pre-clinical phase of their studies \((1^{\text{st}} \text{ and } 2^{\text{nd}} \text{ year of their programme})\) and 183 in the clinical phase \((3^{\text{rd}} \text{ to } 6^{\text{th}} \text{ year of their programme})\). The third medical faculty \((n=176, \text{ pre-clinical } n=90, \text{ clinical } n=86)\) had a PBL curriculum.

Data for this study were gathered with the MED NORD (Lonka et al., 2008) questionnaire, which was mailed to the participants. They were informed that the present study focused on examining students’ views on learning and studying. The self-report questionnaire included 133 items and a background section, and it took about 30 minutes to complete. Participation was voluntary and responses were analysed anonymously. Of the 735 students who received the questionnaire, 610
returned it (i.e., response rate of 83%). The students were informed that those who returned the questionnaire would receive a voucher for a movie ticket as a reward.

2.2.4 Materials

The MED NORD (Lonka et al., 2008) questionnaire was designed to measure several aspects related to student well-being and perceptions of the learning environment. This study focused on a particular section of MED NORD, namely a brief version of the Higher Education Stress Inventory (HESI), designed to capture a variety of stressful aspects and other conditions of the learning environment and can be applied to different higher educational settings (Dahlin, 2007).

The MED NORD includes five HESI scales, which consist of 18 items (Dahlin et al., 2005): disengagement (e.g., “Education produces anonymity and isolation among students”); receiving feedback (e.g., “Teachers give feedback on students’ knowledge and competence”); workload (e.g., “Course literature is too difficult and extensive”); worry (e.g., “I am worried about being able to mastering the pool of knowledge needed in my future profession”) and satisfaction (e.g., “Teachers treat me with respect”). Two HESI scales, low commitment and financial concerns, were not included in MED NORD. All items were rated on a 4-point Likert scale ranging from 1 (not at all true) to 4 (very true).

In addition to the HESI scales, participants’ ratings of experiences of exhaustion and lack of interest were also included. Exhaustion (e.g., “I feel I’m working too hard on my studies”) was measured by four items that were taken from occupational health research and modified to fit studies in higher education (Maslach & Jackson, 1981). Lack of interest (e.g., “The contents of my studies do not interest me”) was measured by two items (Mäkinen et al., 2004). The Exhaustion and Lack of interest items were measured on a 5-point Likert scale ranging from 1 (not at all true) to 5 (very true).

Finally, Academic self-concept was measured by asking the participants to position themselves as compared to their peers. The respondents were asked to indicate, whether their typical grade was worse than the average grade of their class, approximately the same as the average of their class, or better than average. These were coded to 1, 2 and 3 respectfully. In a previous study with a similar non-medical student sample, the correlation between this item and actual GPA was .63 (Nieminen, 2011).

2.2.5 Statistical procedure

After data screening, a confirmatory factor analysis was used to validate the hypothesised survey structure of the MED NORD. The reliability of the latent constructs was assessed using coefficient H (Hancock & Mueller, 2001) and descriptive statistics were calculated. After these preliminary analyses, a model was estimated using structural equation modelling (SEM) to investigate the relationships among students’ perceptions of the learning environment, well-being (i.e., lack of interest and exhaustion), and academic self-concept. Finally, differences of experi-
ences between PBL and non-PBL students were analysed with a multivariate analysis of variance (MANOVA).

For the CFA and SEM, four different fit indices were used. The conventional chi-square test, the Comparative Fit Index (CFI) (Bentler, 1990), the Tucker-Lewis Index (TLI) (Tucker & Lewis, 1973) and the Root Mean Square Error of Approximation (RMSEA) (Browne & Cudeck, 1993), as suggested by Schreiber et al. (Schreiber, Nora, Stage, Barlow, & King, 2006). A ratio of chi-square test score and the accompanying degrees of freedom was also used. A ratio of 3 or less indicates a suitable fit. The CFI and TLI range from 0 to 1, with higher values indicating a better fit. Values of greater than .90 are associated with an acceptable fit and values greater than 0.95 with a well-fitting model. Values of the RMSEA of .05 or less indicate a good fit, while values greater than .10 should lead to model rejection (Browne & Cudeck, 1993). The RMSEA was reported with 90% confidence intervals.

After the SEM analysis, differences between the LBL and PBL programs were investigated using a MANOVA analysis. Data were analysed using a two-way multivariate analysis of variance (MANOVA) with two medical curricula (LBL and PBL) and phase of studies (pre-clinical and clinical) as independent between-subject factors and disengagement, feedback, workload, worry, satisfaction, exhaustion, lack of interest and academic self-concept as dependent variables. Following Cohen, (1988), partial $\eta^2=0.01$ was interpreted as small, partial $\eta^2= 0.06$ as medium, and partial $\eta^2 = 0.14$ as large effect size. The CFA and SEM analyses were conducted using AMOS 18.0 and all other analyses were performed using SPSS 18.0.

### 2.2.6 Results

The reliability of the six latent constructs was assessed using coefficient H (Hancock & Mueller, 2001), which measures the degree of replicability of a construct based on its measured indicators. The construct reliability values ranged from .64 to .89 reflecting good construct reliability.

Confirmatory factor analysis demonstrated that the factor structure of the HESI appeared adequate. The chi-square statistic was statistically significant ($\chi^2[109, N = 610] = 275.1, p < .001$), but the ratio was smaller than 3.0 (i.e., 2.5). Furthermore, results showed a CFI of .90, TLI of .87 and a RMSEA of .050 (90% CI: .043 - .057). Therefore, the HESI factorial structure was considered adequate.
Note. Only latent variables, residual errors and achievement variables are presented. Dotted lines are non-significant paths.
Res = residual; error in the prediction of endogenous factors from exogenous factors.

**Figure 4.** Parameter estimates (standardized regression coefficients) for the structural equation model of the linear relationships between students’ perceptions of the learning environment, exhaustion, lack of interest and academic self-concept (n = 582).

**Relationships between Perceptions of the Learning Environment, Lack of Interest, Exhaustion, and Academic Self-Concept.** After confirming the factor structure of the HESI scales measuring students’ perceptions of their learning environment, a structural equation model was used to test the relationships between these perceptions with lack of interest, exhaustion, and academic self-concept. As presented in Figure 4, the model tested whether exhaustion and lack of interest mediated the relationship between perceptions of the learning environment and academic self-concept. Only students who had answered the item about Academic self-concept (n = 582) were included in the analysis. The model yielded a reasonable fit. The chi-square test was statistically significant ($\chi^2[226, N = 582] = 516.9, p < .001$), but the ratio was smaller than 3.0 (i.e., 2.3). Furthermore, results showed a CFI of .91, TLI of .89, and a RMSEA of .047 (90% CI: .042 - .052).

The results of the structural model are summarized in Figure 4. Worry and, even more strongly, workload were significantly related to exhaustion. Worry and satisfaction were negatively related to lack of interest, whereas workload was positively related to it. Regarding any learning environment perceptions, only workload was related to academic self-concept. Exhaustion was positively, and lack of interest negatively related to academic self-concept.

Finally, we examined whether relations between students’ perceptions of the learning environment and the academic self-concept are completely mediated by exhaustion and lack of interest. This alternative model was identical to the model in Figure 4, but it did not assume paths from the perceptions directly to academic self-concept. Comparing this alternative model resulted with the one in Figure 4 resul-
uted with $\Delta \chi^2 (\text{df} = 5) = 15.94$, which is significant at the .01 level, assuming partial mediation. In other words, adding direct relations between conceptions and processing variables lead to a better explanation of the data compared to complete mediation. Therefore, relations between perceptions of the learning environment and the academic self-concept are only partially mediated by students’ exhaustion and lack of interest.

**Comparing LBL and PBL curricula.** The results of the MANOVA showed significant differences on the dependent measures among the lecture-based and problem-based curricula [Wilks’s $\Lambda = .93$, $F(8, 571)=5.19$, $p < .001$, $\eta^2_p = .068$] as well as among the different programme years [Wilks’s $\Lambda = .92$, $F(8,571) = 6.65$, $p < .001$, $\eta^2_p = .068$]. Furthermore, the interaction effect of the two independent variables was significant [Wilks’s $\Lambda = .97$, $F(8,571) = 2.43$, $p = .014$, $\eta^2_p = .033$].

Univariate results showed significant differences between the different curricula. Students in the PBL school experienced more worry [$F(1)=5.39$, $p = .021$, $\eta^2 = .009$; MD PBL–LBL=.17], received more feedback [$F(1) = 6.96$, $p = .009$, $\eta^2 = .012$; MD PBL–LBL=.15], more exhaustion [$F(1) = 8.45$, $p = .004$, $\eta^2 = .014$; MD PBL–LBL=.24], and higher levels of academic self-concept [$F(1) = 6.08$, $p = .014$, $\eta^2 = .010$; MD PBL–LBL=.15].

There were also differences between the pre-clinical phase and clinical phase of students’ study concerning satisfaction and workload. Students in the pre-clinical phase reported more satisfaction [$F(1) = 11.95$, $p = .001$, $\eta^2 = .020$; MD PreCl – PostCl = .12] and more workload [$F(1) = 13.74$, $p < .001$, $\eta^2 = .023$; MD PreCl – PostCl = .18].

The interaction effect appeared significant for Exhaustion [$F(1) = 7.24$, $p = .007$, $\eta^2 = .012$] and Academic self-concept [$F(1) = 7.05$, $p = .008$, $\eta^2 = .012$]. As can be seen in Table 3, PBL students experienced more exhaustion in the pre-clinical phase compared to LBL students, but not in the clinical years. Table 3 also shows a similar pattern for Academic self-concept. It was significantly higher in the pre-clinical phase for the PBL group, but this difference disappeared in the clinical phase.
Table 3 Means and standard deviations of the eight dependent variables in two medical schools and two phases of studies

<table>
<thead>
<tr>
<th></th>
<th>Lecture-Based (LBL)</th>
<th>Problem-Based (PBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-clinical</td>
<td>Clinical</td>
</tr>
<tr>
<td>Range</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Worry</td>
<td>1–4</td>
<td>2.70</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>1–4</td>
<td>3.42</td>
</tr>
<tr>
<td>Disengagement</td>
<td>1–4</td>
<td>1.69</td>
</tr>
<tr>
<td>Workload</td>
<td>1–4</td>
<td>2.15</td>
</tr>
<tr>
<td>Feedback</td>
<td>1–4</td>
<td>1.93</td>
</tr>
<tr>
<td>Exhaustion</td>
<td>1–5</td>
<td>2.48</td>
</tr>
<tr>
<td>Lack of interest</td>
<td>1–5</td>
<td>1.88</td>
</tr>
<tr>
<td>Academic self-concept</td>
<td>1–3</td>
<td>2.04</td>
</tr>
</tbody>
</table>

2.2.7 Discussion

This study examined 1) how experiences of the learning environment were related to exhaustion, lack of interest and academic self-concept and 2) how these experiences differed between PBL and LBL medical schools and different study phases (preclinical/novice, clinical/advanced).

Construct reliability values of the HESI scales gave evidence of good reliability in terms of internal consistency. Based on the reliability measures and confirmatory factor analysis of the present data, students were able to distinguish between the five different perceptions of the learning environment and the HESI scales were adequate measures of learning environment perceptions in the used sample.

Relations between perceptions of the learning environment, early signs of burnout (i.e., exhaustion and lack of interest), and academic self-concept were examined with a structural equation model. Workload and worry about future endurance were related to exhaustion, which was in line with the study’s hypothesis. This result is in line with earlier findings about the unfavourable effects of high perceived workload (Guthrie et al., 1995; Wolf, Faucett, Randall, & Balson, 1988) and worries about future competence (Dahlin et al., 2010) on students’ well-being. The strong negative relation between satisfaction and lack of interest corresponded with the second hypothesis. If a medical student already loses interest or becomes
cynical during his or her studies, chances are that this will continue in working life (Dahlin et al., 2010; Salmela-Aro, Tolvonen, & Nurmi, 2009).

The negative relation between worry about future competence and lack of interest was rather surprising. It could be argued that worry about one’s competence and workload in one’s future profession reflects commitment to this profession, which would relate to higher interest (i.e., lower levels of lack of interest). It could be a sign of devotion and high ethics; concentrating on one’s competence and skills is probably good for motivation to continually develop oneself. The positive relation between exhaustion and academic self-concept is probably in line with this, reflecting the high standards and working morale. While some amount of challenge and workload is needed for effectively focusing attention, excessive demands are not desirable (Kember & Leung, 2006). Prolonged worry and exhaustion may result in problems in occupational health.

The $\Delta \chi^2$ tests supported partial mediation between the perceptions of the learning environment and academic self-concept by exhaustion and lack of interest. Therefore, relations between perceptions of the learning environment and the academic self-concept are only partially mediated by students’ exhaustion and lack of interest.

Students in a pre-clinical phase of their studies experienced more workload and satisfaction than students in the later phases of their studies. At the beginning of their studies, the students need to make an effort and learn new strategies to be able to grasp extensive amounts of information resulting in increased workload. In the pre-clinical phase, students have predefined lessons and practical sessions, and the programme may seem structured and easier to comprehend. Dealing with the uncertainty and emotional complexity of working with real medical cases in the clinical phase requires an adjustment of the student and this may lead to more dissatisfaction. Moreover, the experiences of being treated unfairly have been found to be most common during the clinical phase of the studies (Elnicki et al., 2002).

The PBL curriculum appeared an engaging but challenging environment for novice students. As was expected, PBL students reported more exhaustion than their peers in the non-PBL group at the beginning of their studies. During this time, PBL students may be forced to work at the upper limits of their skills. In addition, PBL students reported higher levels of concern for their studies than students in the lecture-based group. This concurs with findings by Moffat et al. (2004) about uncertainty in study behaviour, progress, aptitude and assessment and by Lewis et al. (2009) about PBL students feeling uncertain about what is expected of them by the faculty and experiencing the curriculum as unclear. PBL students, however, also reported higher levels of academic self-concept in the pre-clinical phase of their studies. In line with the study hypothesis, they also experienced receiving more feedback. Contrary to the hypothesis, there was no difference in the level of experienced workload.

In the following study we wanted to look more closely at how students experience their studies in different course settings.
2.3 Study III

2.3.1 Aims

The aim of the study was to explore how students experience teacher-centred instructional arrangements as compared to inquiry-based learning. We anticipated that the students would experience intense affects when moving from teacher-centred to the inquiry-based study. We also anticipated that the participants would experience greater challenges in the inquiry-based conditions. It was assumed that the experiences would differ only in study-related situations, and that no difference would be found when participants were not studying.

2.3.2 Context of the study

The present study focused on comparing students’ contextual learning experiences across two 14-day follow-ups, the first (year 1) consisting mostly of lectures, and the second (year 2) focusing on an intensive inquiry-based project. The study took place in a teacher education program with a yearly intake of 10 students that majored in educational psychology. Studying is arranged in an intensive ten-student group for the first three years of five-year Master’s degree studies. The students study intensively as a small group for three years, applying progressive inquiry-based learning as one of their main approaches.

During the first-year follow-up, the students studied various subject-matter based courses in the teacher-training programme. Both lectures and small-group sessions were involved. During the second follow-up, the students focused on a progressive inquiry-based project of which object of inquiry was how emotions influence learning. The student teachers worked collaboratively with university lecturers and approached their inquiries from multiple perspectives.

2.3.3 Participants and procedure

The participants were nine (N=9) student teachers at the University of Helsinki, in Finland, who volunteered to participate in a two-year longitudinal comparative study, part of a large four-year research programme. Contextual data on the participants’ learning experiences were collected with the contextual activity sampling system (CASS) (Muukkonen et al., 2008). The participants were given mobile phones that notified them to respond to questionnaires concerning their study processes in terms of challenge and competence as well as their academic emotions, five times a day. The 3-hour pre-defined intervals were customized according to a schedule the student preferred (e.g., 9.00, 12.00, 15.00, 18.00, 21.00).

Altogether, 1010 observations were collected from the nine students during the two periods (508 the 1st year, 502 the 2nd). The number of queries sent was 630 each year. The response rate was thus 80.2%, ranging between subjects from 48.6 to 96.4%.
2.3.4 Materials

The questionnaire (Muukkonen et al., 2008), which employed the CASS methodology, focused on issues concerning context and experiences. Firstly, the participants were asked to record what they were doing. Secondly, multiple-choice questions were posed to define the participant’s context (Where are you? Are you studying?). Thirdly, affects were measured using a PANAS scale (Watson et al., 1988), which focuses on positive (interest, enthusiasm, determination, energetic) and negative affects (stress, irritation, nervousness, anxiety). Fourthly, the questionnaire addressed the aspects of competence (How competent do you feel?), challenge (How challenging is the situation?), importance (How important is this to you?), and commitment (How committed are you to doing this?). The items concerning affects, competence, challenge, importance and commitment were answered using a seven-point Likert scale ranging from 1=not at all to 7=very much.

2.3.5 Interviews

In addition to involvement in the CASS process, each participant underwent a semi-structured interview before and after the inquiry-based period in the second year. The interviews before the follow-up focused on how the students experienced their studies in general, while the interviews after focused especially on their experiences during the two-week period. The interviews were recorded and transcribed. The transcribed interviews were analysed qualitatively using a phenomenological approach (Smith & Osborn, 2008) focusing on the individual’s descriptions of his or her experiences during the inquiry-based project, and data from both interviews before and after the follow-up were analysed together. Each individual interview was thoroughly examined, and statements were extracted and placed under three broad thematic headings, derived from the scales used in the CASS questionnaire: (1) positive emotional experiences, (2) negative emotional experiences, and (3) experiences of competence and of being challenged. These themes were then evaluated and described in terms of how they related to aspects of the inquiry-based project. Excerpts from the interviews were used as examples.

2.3.6 Statistical procedure

Multivariate analysis of variance. To see whether the students’ study-related experiences differed during the teacher-centred and inquiry-based periods, a 2 X 2 MANOVA was performed on five dependent variables. The independent variables were the instructional format (teacher-centred vs. inquiry-based) and situation (studying vs. not studying).

The dependent variables were positive affects, negative affects, competence, challenge and importance. Three sum variables were created. Two sum variables were formed to describe positive (interest, enthusiasm, determination, energy) and negative (stress, irritation, nervousness, anxiety) affects. Both were composed of four variables and their Cronbach’s alpha’s were .87. The items concerning importance and commitment were summed to measure importance of a situation for
the participant. This variable was named Importance and its Cronbach’s alpha was .80. Items concerning challenge and competence were analysed as single variables. After the five variables were created, they were standardized to z-points on a within-subject level. Only three of the five daily observations were included in the MANOVA, because the morning and evening queries did not include questions about whether or not the participant was studying. Following missing value and outlier analyses, the number of observations included in the MANOVA analysis was 575.

Students’ experiences during the inquiry-based study period were also analysed using time-series analysis at a group level. This was done in order to illustrate the group average concerning positive and negative affects, competence, and challenge. As a result, a figure describing the mean values for the whole group at a particular moment was formulated. The moments when the students were working together on the inquiry-based project were also drawn from the data.

### 2.3.7 Results

The differences in teacher students’ experiences between teacher-centred and inquiry-based periods. The participants experienced study situations during the inquiry-based period as more challenging and affect-provoking than during the teacher-centred period. The MANOVA showed that participants’ experiences differed between the two periods (teacher-centred and inquiry-based) and in the different situations (studying and not studying). With Wilks’ criterion, the main effects for dependent variables (positive affects, negative affects, importance, challenge and competence) were significantly affected by both study period (teacher-centred vs. inquiry-based) \[ F(5, 571) = 7.52, p < .001 \] and situation (studying vs. not studying) \[ F(5, 571) = 39.52, p < .001 \]. Moreover, interaction of the two independent variables was also significant \[ F(5, 571) = 2.84, p = .015 \], indicating that study experiences during the two periods differed. The results showed that the study period had a medium effect on the combined dependent variables (partial \( \eta^2 = .075 \) with 95% confidence limits (cl.) from .033 to .112), and that the situation (studying vs. not studying) had a large effect on dependent variables (partial \( \eta^2 = .257 \) with 95% cl. from .195 to .310). For the interaction, the association was small (partial \( \eta^2 = .024 \) with 95% cl. from .001 to .046). Because the goal was to determine whether the study-related experiences differed during the two periods, only the interactions’ of independent variables (study period and situation) on individual dependent variables are presented in the following section. The differences of experiences between the two periods in studying and non-studying situations are shown in Figures 5 and 6.
Figure 5. Positive affects (PA) and negative affects (NA) during the two follow-up periods while studying and not studying (95% confidence limits).

Figure 5 shows that negative affects were higher while studying during the inquiry-based period compared to the teacher-centred period. The figure also shows that there were no statistically significant differences in Positive affects between the two periods in either the situations where the participants were studying or in the situations where they were not. In addition, negative affects remained the same when the participants were not studying. Although they appear to be slightly higher during the inquiry-based period, the variation was well within the range of confidence limits as also confirmed by the MANOVA. The interaction of the period and studying on negative affects was small but significant [F(1) = 8.88, p = .003] (partial $\eta^2 = .015$ with 95% CI from .002 to .041). The interaction of the independent variables on positive affects was not significant [F(1) = 1.06, p = .305].

Figure 6 shows that challenge was higher while studying during the inquiry-based period than during the teacher-centred period. The figure also shows that the levels for competence and importance did not differ statistically significantly between the two periods in the studying and not studying situations. This was also true for competence as confirmed by the MANOVA. The interactions of the period and studying on importance [F(1) = .07, p = .794] and competence [F(1) = .139, p = .706], were not significant. The interaction of independent variables on challenge was significant [F(1) = 4.56, p = .033], but very small (partial $\eta^2 = .008$ with 95% CI .000 to .028).
In conclusion the MANOVA showed that the inquiry-based period evoked more negative affects and challenge than the lecture-based period did. In addition to these differences, it is worth noting that in situations where the participants were not studying, the values remained at the same level. In other words, experiences outside studying did not differ between the periods.

**Students’ descriptions of the inquiry-based project**

Overall, the emotional experiences that the students identified in relation to the project varied and were diverse. Moreover, variation was experienced even within individual meetings. For example, as one participant commented: “Usually the meetings related to our project have varied a lot, and there has been extreme frustration. Or we have lacked a spark, but then it kind of lights up (022).”

Positive emotional experiences were described not as relating to a single event or meeting, but more broadly, as relating to studying during the project in general. The participants noted that they were unable to name a single event as distinguishable from the others. While the CASS data revealed only higher negative experiences and challenges, the interviews revealed that the students also enjoyed working on the project. The most frequently used terms were “interest”, “excitement”, “feeling of accomplishment” “successful collaboration” and “progress in the project”. Positive experiences related to collaboration, autonomy and interest in the topic. Collaboration within the group was considered to be a motivator: “The group works together and everybody has his or her own role, while all are still doing so
many things, and when it is created together it is really, really cool (031)”. This reference also indicates that the group’s cohesion was considered to be strong. The group was not new—the nine students had been studying together for one and a half years. However, many of the students noted that during the inquiry-based period they felt that the group had reached more of its potential than before. The group being autonomous was considered as characteristic of the inquiry-based setting and was seen as a learning opportunity. In addition to being responsible for the learning process, the students also had to plan the content and how to study it, together with the teachers. While the students experienced autonomy as a group, this was also seen as an individual’s opportunity to have an effect on what was done collaboratively. In many cases these two intertwined and were seen as strongly motivating elements. One student noted, “Well, in a way I have had an influence on which topic we chose, and in a way it became like my own (081)”. The topic was seen as interesting, and having an influence on its selection made it possible to include the interests of different participants. In addition to being interested in the topic at hand, many reported having an interest in the group’s functioning and in the dynamics themselves.

Negative emotional experiences relating to the project included feeling busy, tense, tired, unable to keep up or in a state of chaos. While the inquiry-based project was described by intense negative affects, none of the participants mentioned boredom, being disinterested, or other low-intensity negative affects. These, however, were mentioned in connection with other courses outside the studies in the study group, such as lecture courses. Similarly to the positive emotional experiences, the negative experiences were associated with autonomy and collaboration. Autonomy and facing ill-defined problems produced frustration, as another student mentioned “but then, at least when I felt that the topic was overwhelmingly extensive and I could not grasp it, it felt really frustrating (031)”. Although the collaborative work was motivating, it was also considered to be difficult and a source of conflict, as this student noted: “Well, we had some afternoons where it felt like ‘Where is this group going? Has the group lost its ability to do anything, when everybody just shouts at each other?’(032)”. Experiences of competence and being challenged. Experiences of being challenged related mostly to organizing the collaborative work. Working on the inquiry-based project was considered a novel way of working, and one which required extra effort. Organizing the work encompassed covering the interests of as many participants as possible, forming a coherent object of inquiry, and at the end of the project sharing the work to collaboratively write a common portfolio of the project. Furthermore, at times the group seemed to face challenges they were unable to handle. In these cases, members reported relying on their lecturers for advice: “And Lecturer X said this might be an easier way to approach this topic, and that of course there are these kinds of aspects to be considered here (071)”. In general, challenges were not considered to be too high, but rather at an appropriate level. The group was given a collective grade on a scale from one to five, five being the highest. Members took part in evaluating the process together with the teachers. The students were somewhat critical of the group’s performance, although they considered it a valuable learning experience, as one student suggested:
“Originally, we felt that we were not very successful, that we should give ourselves a three. However, when I think about it now, we did really well. If I would have to grade the learning experience, it would be a five (012”).

**Black Tuesday**

The variation of positive and negative affects of all nine participants was examined during the second period, when the students were collaboratively involved in the inquiry-based study. Figure 7 presents the sliding mean of the whole group’s affects as a whole. Sequences where the participants worked together are also shown.

![Figure 7. Participants’ (N = 9) positive and negative affects during the two-week follow-up (z-points)](image)

Figure 7 shows that during the second Tuesday of the inquiry-based period, the participants’ Negative affects were particularly high. It also shows that during the first weekend, the students’ positive affects were high at the group level while negative affects were low. However, a similar pattern was not detected during the second weekend. This may be because the project’s final deadline was approaching, and in the interviews the students reported that they were working on their assignments over the weekend. Figure 8 shows the group averages for challenge and competence, which were calculated the same way as with positive and negative affects.
Figure 8. Participants’ (N = 9) experiences of competence and being challenged, during the two-week follow-up (z-points)

Figure 8 indicates that during the second Tuesday, challenge was above average and competence was below average. Although the actual levels were similar to the other situations, it is worth noting that the difference between challenge and competence was clearly distinct. On this very day, high levels of challenge were reported at the same time as the students reported low levels of competence.

In the interviews after the second CASS follow-up, the students were interviewed about their experiences during the two-week period. When the interviewer asked about negative experiences during the second follow-up, five of the nine participants spontaneously mentioned the Tuesday afternoon of the second week of the follow-up as a stressful experience. The students shared the responsibilities of the meetings so that two were always in charge of a meeting. One of the students who was in charge described events as follows:

That one I remember. These two times (observations during one day). They were really distressing. I mean, nothing worked out. In our group we had a problem, a pretty challenging learning task in mathematics. Some of us were really frustrated and it didn’t seem to work out. I mean I was in charge of the mathematics, and so I and the (other person in charge) got frustrated, because we felt that the others were not trying hard enough. And we had this extra pressure. I think it was because the previous week had been very burdensome. But I think that it really was a difficult learning situation. I mean the mathematics were challenging for us anyway. And it ended up so that we had no time or means to accomplish this. We felt like giving up. (F1)

As is evident from the above extract and Figures 7 and 8, the same Tuesday meeting can be perceived as a negative experience, in terms of both the CASS data and the interview.
2.3.8 Discussion

The aim of this study was to compare teacher students’ experiences during two different periods (teacher-centred and inquiry-based) and to explore how experience-sampling data could be used to describe students’ experiences during the inquiry-based period. The results indicated that the students’ studying experiences differed during the two periods. Negative affects (stress, irritation, nervousness, anxiety) in study situations were higher during the inquiry-based period than during the teacher-centred period. Further, the students reported being challenged more while studying during the inquiry-based period. On the other hand, the interviews showed a more diverse picture of the emotional experiences. The students reported both positive and negative emotional experiences, along with those of being challenged, and all of these mostly related to collaboration and co-regulating the learning process.

In the fourth study, the goal was to explore how students’ in different fields differ in their approaches to learning and whether this is related to how they see their learning environment.

2.4 Study IV

2.4.1 Aims

The fourth study focused on analysing combinations of approaches to learning among undergraduate students in different disciplines. The first aim was to cluster the students on the basis of their scores on different items measuring approaches to learning, and to explore the relationship between the resulting clusters and the faculties represented. The second aim of the study was to analyse the differences in perceptions of the learning environment in different faculties.

2.4.2 Context of the study

The study was carried out in every faculty of the University of Helsinki except for the Faculty of Medicine (10 of the 11 faculties). The included faculties differ in many ways. The Faculties of Law, Pharmacy, Theology, and Veterinary Medicine offer degree study programmes on both the Bachelor’s and Master’s level that incorporate various sub-disciplines and therefore, represent more homogeneous disciplinary contexts than the other faculties. On the other hand, the Faculties of Agriculture and Forestry, Arts, Behavioural Sciences, Biosciences, Science, and Social Sciences are multidisciplinary. Agriculture and Forestry comprises the departments of agro- and food technology, animal science, applied biology, chemistry and microbiology, economics and management, and forest ecology. The Faculty of Arts is the largest one with various language and literature departments as well as the departments of history, philosophy, art research, and cultural research, among others. Behavioural Sciences comprises departments such as teacher education, educational sciences, psychology, and speech science, while biosciences includes the departments of biological, ecological, and environmental sciences. The Faculty of
Science incorporates the departments of astronomy, chemistry, computer science, geography, and physical sciences. Finally, the Faculty of Social Sciences has departments of communication, economics, political science, social policy and sociology.

2.4.3 Participants

The data were collected in spring 2006 through an electronic questionnaire sent to first- and third-year students at the end of the study year. A total of 2,509 students participated in the study. The response rates varied between faculties, the highest being in the Faculty of Veterinary Medicine (86%) and the lowest in the Faculty of Biosciences (28%). The response rates of the first- and third-year students were 34% and 31%, respectively.

2.4.4 Materials

The questionnaire used in the present study was a modified version of the Experiences of Teaching and Learning Questionnaire (Entwistle, McCune, & Hounsell, 2003). The ETLQ was developed to measure how specific changes in the teaching–learning environment affect students’ approaches to studying, and focuses on teaching and learning in a course unit or module (Entwistle & McCune, 2004). It was modified for the present study to measure students’ perceptions of the teaching in their major subject rather than a specific course unit or module. Two sections of the original ETLQ were used. The first section comprised 40 items covering students’ perceptions of their teaching–learning environment, and the second section was a shortened 18-item version of the Approaches to Learning and Studying Inventory, in which the students were asked to describe how they had been studying within the course unit (Entwistle & McCune, 2004). A five-point Likert scale in which the responses ranged from ‘agree’ to ‘disagree’ was used.

2.4.5 Statistical procedures

In order to explore and to clarify the picture of the various combinations, the students were divided into homogenous subgroups based on their approach to learning (18 items) using latent profile analysis (Muthén & Muthén, 2007). LPA allows the derivation of information about categorical latent variables from the observed values of continuous variables. The advantage of this approach over traditional heuristic cluster analysis (e.g., K-means) is that it is model-based, and generates probabilities of group membership (Vermunt, 2003; Vermunt & Magidson, 2002). It is also possible to test the models and to analyse their goodness of fit. The number of clusters may also be partly statistically determined. The Lo–Mendell–Rubin (LMR) likelihood ratio test of model fit (Lo, Mendell, & Rubin, 2001) compares the estimated model with a model with one class fewer than the estimated model. The p-value obtained represents the probability that the data have been generated by the model with one class fewer: a low p-value indicates the rejection of this model in favour of the estimated model. An adjustment to the LMR test is also
Overview of the original studies

The model with one class fewer is obtained by deleting the first class in the estimated model. LPA seeks to identify the smallest number of latent classes (i.e., clusters) that adequately describe and reproduce the covariances among the observed continuous variables as manifested in the 18 approach items. The LC clustering solution is invariant of linear transformations on the variables; thus, standardization is not necessary. Solutions were generated by means of ML estimation starting from two groups and ending with six. The Bayesian information criterion (BIC) and the VLMR likelihood ratio test were used to find the number of groups with the best fit.

Having established the clusters based on the 18 items measuring approaches to learning, bivariate associations using chi-squared and one-way ANOVAs were assessed. Canonical variate analysis (CVA) was the method chosen for the final analyses (Thorndike, 1978). This method allows for many variables in sets 1 (explanatory) and 2 (dependent). Nominal variables (faculty, cluster) were treated as indicator-coded dummy variables (Cohen, Cohen, West, & Aiken, 2003). CVA makes it possible to take statistical account of other background variables and to use adjusted values of dependent variables (Levine, 1977). The ratio between the observations and the variables was better than 60, which has been set as a reasonable limit when using dummy variables (Darlington, Weinberg, & Walberg, 1973). Bartlett’s chi-squared (based on Wilks’ lambda) offers a solution for comparing nested CVA models. It could be said that CVA (i.e., set correlations) provides a single framework of measures of association, parametric estimation, hypothesis testing, and statistical power analysis that encompasses most of the standard data-analytic methods (Cooley & Lohnes, 1971; Cooley & Lohnes, 1976; Van de Geer, 1971). Partial eta-squared were used to measure effect size and an effect size of 0.02 was considered small, and 0.15 as medium. Items (18 variables) indicating various approaches and perceptions (regression-estimated factor scores, six variables) were linearly transformed into a scale in which mean was set at 500 and standard deviation at 100 for illustration purposes and in order to simplify the visual comparisons. The results are presented mainly in figures. All the associations discussed are statistically significant (at least $p<.001$) unless otherwise indicated. SPSS for Windows version 16, and especially the MANOVA module was used for all the analyses except for the LPA, which was done in MPLUS.

2.4.6 Results

Cluster groups that emerged. According to the LPAs the four-class solution seemed to fit the data best. Multiple solutions from two to six clusters were obtained, and the BIC and VLMR likelihood ratio test and the adjusted version of it were run. Classification quality and entropy, and assessed interpretability and usefulness in accordance with substantive theory were taken into account. The clearest winner in this competition was the solution with four clusters; adding clusters did not give a significant advantage when statistical or substantive criteria were used. The LPA with four groups was also very good in the light of the results obtained from the linear discriminant analysis.
The first cluster comprised 899 (35.8%) students who scored highly on items measuring Organized studying. These students scored low on items measuring Deep approach, and average on items measuring Surface approach and Intention to understand. This cluster was labelled as Organized students. The second cluster included 675 (26.9%) students who scored the highest on both Deep approach and Intention to understand. These students also achieved the highest scores on Organized studying and lowest on Surface approach. This cluster was labelled Students applying a deep approach. The third cluster, which we called Students applying a surface approach, comprised 390 (15.5%) respondents with the highest scores for Surface approach and the lowest for Deep approach, Organized studying, and Intention to understand. Finally, the fourth cluster included 545 (21.7%) students with the second highest scores on items measuring Deep approach and second lowest on items measuring Organized studying. These students achieved close-to-average scores on both Surface approach and Intention to understand. We labelled the cluster Unorganized students applying a deep approach. The cluster profiles based on the four factors measuring approaches to learning are presented in Figure 9.

Disciplinary differences. The first aim of the present study was to explore the relationship between the clusters and faculty membership: students studying in the 10 faculties were compared according to the cluster into which they fell. Firstly, the canonical analyses showed a statistically significant relationship between the sets of explanatory (faculty, study year, gender, earned credits) and dependent (cluster) variables. Secondly, MANOVA analyses showed that the relationship between the individual explanatory variables and the dependent variables was statistically significant (partial $\eta^2=0.015$). Univariate analysis was then conducted separately for
each faculty. The effect size (partial $\eta^2$) remained low and varied between 0.002 and 0.010. Furthermore, there were no statistically significant differences in three faculties, namely Biosciences, Arts, and Social Sciences, compared to the prevalence of the clusters in the total sample. As can be seen in Figure 10, frequencies of the cluster Organized students were higher in faculties representing the hard sciences. Further on, there were fewer Students applying a surface approach in the faculties representing the soft sciences. A Deep approach cluster also seemed to be more common in the faculties representing soft sciences. Unorganized students applying a deep approach seemed to be as frequent in both groups.

![Figure 10. Cluster percentages in 10 faculties. Redrawn for this thesis based on original results.](image)

**Students’ experiences of their learning environments.** The second aim of the present study was to examine differences in students’ perceptions of their teaching–learning environment in different faculties when other background variables (cluster, study year, gender, and earned credits) were statistically controlled for. Firstly, the MANOVA showed a statistically significant relationship (partial $\eta^2 = 0.065$) between the faculties and the dependent variables (i.e., six factors measuring perceptions of the teaching–learning environment). Secondly, the univariate analysis showed that there were statistically significant differences between each of the six dependent variables and the faculties: the effect size (partial $\eta^2$) varied between small (0.040) and medium (0.163). The comparisons generally showed that students at the Faculty of Law achieved lower scores, and those studying at the Faculty of Veterinary Medicine achieved higher scores than students in other faculties on the six factors measuring perceptions of the teaching–learning environment: more precisely, the veterinary students achieved the highest scores on the four factors. As can be seen in Figure 11, there were no clear differences between faculties
representing hard and soft sciences. Students from the Faculty of Theology achieved the highest scores on the factor measuring staff enthusiasm and support, and the pharmacy students on constructive alignment. Students of law achieved the lowest scores on four factors (all except support from other students and interest and relevance), while science and theology students were lowest on interest and relevance, and support from other students, respectively.

![Graph showing factor scores for different faculties.](image)

**Note.** Redrawn for this thesis based on original results.

**Figure 11.** Six factors measuring students’ perceptions of the teaching-learning environment in 10 faculties. Redrawn for this thesis based on original results.

### 2.4.7 Discussion

On the basis of Latent profile analysis (LPA) four clusters were formed. The students in the second and third clusters (students applying a Deep approach and students applying a Surface approach) clearly differed and were easy to interpret on the basis of previous research: those in Cluster 2 achieved the highest scores on items measuring a Deep approach and organized studying, while those in Cluster 3 achieved the lowest scores on Organized studying. These results are in line with those of previous research showing that a strategic approach correlates positively with a Deep approach and, respectively, negatively with a Surface approach (e.g., Entwistle, Tait, & McCune, 2000)).

The first (Organized students) and fourth (Unorganized students applying a Deep approach) clusters are more problematic to interpret. Students in Cluster 1 scored highly only on items measuring Organized studying, and rather low on items measuring Deep approach. No other items clearly emerged from their cluster profile. Interestingly, these students appear to be systematic in their studies without looking for arguments and justifications for various perspectives, and at the same
time they achieved similar scores on both the Intention to understand and the Surface approach scales. In contrast, students in Cluster 4 with the second highest scores on Deep approach and the second lowest on Organized studying appear to take a critical and analytical approach to their learning, but at the same time they do not seem to be systematic. The combination of approaches here is very interesting, and warrants further investigation of the relationship with academic achievement.

The composition of Clusters 1 and 4 shows a clear division among students taking a deep approach between those with intention to understand and those with a process of understanding, such as relating ideas and using evidence. This is in line with previous studies (Parpala et al., 2013). The focus here was on the individual level. The present study suggests a more autonomous role for the organized or strategic approach than found in previous studies (Kember & Leung, 1998; Kember, Biggs, & Leung, 2004; Richardson, 1994).

Again in Clusters 1 and 4 the students achieved near average scores on Intention to understand and Surface approach. On one hand, this may reflect a dissonant study profile (or orchestration) characterized by atypical combinations of aspects of studying that do not fit together theoretically (Meyer, 2000), and on the other hand, scoring similarly on deep and surface approaches to learning may reflect a strategic approach involving changing the approach to learning depending on the course of study.

The results further confirm those reported in previous studies by clearly showing that students’ approaches to learning were related to their experiences of their teaching–learning environment: those in Cluster 2 achieved the highest scores and those in Cluster 3 achieved the lowest on almost all scales measuring positive perceptions of the teaching–learning environment (Kreber, 2003; Lawless & Richardson, 2002; Lawless & Richardson, 2002).

Disciplinary variations. Previous research has shown that students who study the soft disciplines score higher on a Deep approach to learning than students who study the hard disciplines do. The results of the present study reflect these earlier findings in that, students in the behavioural and social sciences were most likely to fall into Cluster 2 (students applying a Deep approach).

Only 15% of the entire sample of students belonged to the third cluster. However, regarding the Faculties of Pharmacy and Science over 20% of the students belonged to the Cluster 3 (students applying a Surface approach). This is also in line with the results of previous research on the effect of the study discipline on approaches to learning (Smith & Miller, 2005).

There were more students in the hard sciences that belonged to the Organized students cluster. On the other hand, students in the soft sciences were less likely to belong to Cluster 3 (students applying a Surface approach). Concerning perceptions of the learning environment there were no clear differences between students in the hard and soft sciences.
3 Discussion

In the general introduction, it was argued and presented that, by combining different methodologies and theoretical perspectives such as students’ experiences in the learning situation and more global perceptions of the learning environment; a more comprehensive picture of how higher education students experience their studies can be constructed. In this thesis, experiences were analysed at three levels: cognitive, motivational and emotional. These were defined respectively as the student’s perceptions of the learning environment, study-related personal goals and emotional experiences at the learning situation. The main goal was to explore how students experience their studies in different environments and to find ways to support successful engagement in studies. In the original articles, the findings of the four studies are discussed thoroughly in the light of prior research. Here the focus is on the overall understanding of university student experiences. The most important findings of this thesis were as follows:

1a) Successful engagement with the learning environment is not merely about seeing the studies as important, being satisfied with the faculty or career choice, or seeing oneself as capable of achieving the tasks. Those students who had the highest achievements were the ones who also experienced stress, worry about competence and to some extent exhaustion.

- In Study I, participants were divided into three clusters: non-committed, self-fulfillers and committed. The non-committed students evaluated their goal as stressful, and they experienced little progress in terms of achieving it. The self-fulfillers did not consider their described goal stressful and saw themselves as capable of achieving it. The committed students had high evaluations of both progress in achieving the goals and seeing the goal as stressful. After three years of studying, the committed students had achieved, on average, 18 credits more than the non-committed.

- In Study II achievement was measured with academic self-concept, which measures how the student sees him- or herself progressing in studies when compared to others. The results of Study II show that exhaustion was positively related to academic achievement indicating that the more students experienced their studies to as exhausting, the more they also saw themselves as capable academically.

1b) Unsuccessful engagement seems to relate to losing interest in one’s studies.

- In Study I the non-committed students had more goals focusing on studies outside their own faculty than students in other clusters, and subsequently did not progress in their studies as rapidly as the committed students,
• In Study II academic self-concept was negatively related to lack of interest. In other words, those students who were less interested in their studies also saw themselves as less capable academically.

2) Negative affects, experiences of high levels of challenge and exhaustion may be an essential part of the process of gradually learning to take responsibility for both individual and collaborative learning processes.

• In Study II, novice students (1st and 2nd study year) in problem-based curriculum experienced higher levels of exhaustion than students in lecture based curricula. No such differences were found between students in the later phases of their studies (3rd and 4th years of their studies). It seems that they learned essential skills for dealing with the challenges of a PBL environment.

• In Study III students’ contextual experiences were compared during a lecture-based and inquiry-based period. Students experienced more challenge and negative affects in the learning situations during the inquiry-based period. However, in the interviews they also emphasized positive experiences during the inquiry-based period, such as interest, excitement and successful collaboration in addition to the stressful and challenging ones.

3) Students’ experiences of their learning environment are not related to a single feature or set of features, but are connected to both their approaches to learning and the qualities of the faculty and its used pedagogy.

• The results of Study IV indicate that the way a student experiences the learning environment is affected not only by the students’ approach to learning, but also by the way the learning environment is structured, such as the nature of the curriculum and the pedagogical solutions. For example, students with an organised or deep approach generally evaluated their learning environment as more favourable and encouraging. Further on, in those faculties as Behavioural Sciences where there was more group work, students experienced receiving more support from other students when compared to students in Theology and Sciences faculties, where studying is focused on more individual settings.

3.1 Methodological reflections

In the introduction it was argued that the three levels of human experience are cognitive, motivational, and emotional. To study students’ experiences at these three levels requires a combination of different research methods. Quantitative methods are at their best able to capture relations, differences and trajectories between constructs or individuals. Quantitative data in educational research usually consists of a rather large number of questionnaire responses, and their strength lies in the generalizability of findings. Qualitative methods, on the other hand, aim to form a more in-depth understanding of a phenomenon and usually focus on more limited
and smaller samples. Purists supporting both approaches have argued that the two paradigms cannot and should not be mixed, because of the incompatibility between the two (Howe, 1988). This incompatibility refers to different conceptions of ontology and epistemology, and the relationship between the researcher and the object of research. Quantitative methods are originally grounded on positivism, which states that scientific knowledge must be based on pure observation and be free of subjective views and interests of values of individuals. On the other hand, qualitative methods are based on a more interpretive paradigm, which states that social sciences are based on human intentions and beliefs and those cannot be eliminated from the research process. Therefore, some argue, the two approaches are not compatible.

Opposed to separating the two research traditions is the mixed-methods approach. It welcomes the different views of qualitative and quantitative approaches and combines them in a single research design. Rather than trying to solve the underlying incompatibilities between quantitative and qualitative traditions, mixed-method researchers acknowledge the contradictions in the epistemologies, but separate the epistemology from use of the method (Sale, Lohfeld, & Brazil, 2002). The goal is to use the strengths of each approach. Johnson and Onwuegbuzie (2004) contend that researchers need to begin asking when each research approach is most helpful and how they could be mixed or combined. Taking a non-purist or mixed position allows researchers to use methods and designs that offer the best chance of answering a specific research question.

In this thesis, Studies II and IV were closest to a purely quantitative study using a questionnaire with traditional Likert scales. However, especially the questionnaire used in Study IV has its origin in qualitative studies (Entwistle & McCune, 2004); thus, it may be seen as part of a continuum from qualitative descriptions of learning approaches and perceptions of the learning environment to a quantitative approach quantifying differences between different types of learners and different learning environments. This two-step research design takes the so called first-order student perspectives from comprehensive interviews as a basis for second-order theoretical analysis conducted with inventories, and as such strives to maintain the students’ own experience as the starting point of research (Lonka et al., 2004). In Study I, which focused on Theology students’ study related goals, the contents of the goals were analysed with a qualitative analysis, although otherwise the focus was more quantitative. The qualitative content analysis gave insight into what the students were actually striving for while the quantitative analysis of evaluations focused on how students saw their goals. Study III was most clearly a mixed-methods research and described why mixed methods have been said to show how “words, pictures, and narrative can be used to add meaning to numbers” (Johnson & Onwuegbuzie, 2004 p. 21). The quantitative experience sampling data revealed that students experienced the inquiry-based period of studying as more stressful and challenging when compared to a lecture-based period. Without the interview data describing the specific features of experiences and also showing how the students emphasized the meaningfulness and importance of the inquiry based project, the interpretation of experiences would have been more one-dimensional.
3.1.1 Variable-centred and person-centred quantitative methods

In this study quantitative methods were used as both variable-centred and person-centred. Variable-centred strategies are more appropriate for questions concerning universal relations among variables and processes of change; person-centred strategies are more appropriate for questions concerning differences among individuals and how developmental trajectories differ across groups (Laursen & Hoff, 2006). While variable centred methods help to understand general principles that connect variables on a larger scale, person-centred approaches help to understand why trajectories of some individuals differ from those of others.

As with the choice between qualitative and quantitative methods, the choice between different quantitative approaches should be dictated by the research question. Similar to mixing of quantitative and qualitative methods, variable-centred and person-centred approaches complement each other. The relation between appraisals of study related goals was studied with a person-centred cluster analysis in Study I. A similar phenomenon was studied with a the variable-centred structural equation model in Study II with a focus on how students’ experiences of their learning environment are related to problems with their well-being and further on to their academic self-concept. Although the comparison in Study III of students’ experiences during the inquiry-based and lecture based periods employed a multivariate analysis of variance, which in its essence is a person-centred method, in this particular case the analysis may be described as group centred. All the observations the group of nine students reported were pooled together and compared between the two periods and in situations in which the students were studying and not studying. The person centred K-means cluster analysis in Study I and Latent Cluster Analysis in Study IV were oriented toward categorizing individuals by patterns of associations among variables; thus, they also represented a person-centred approach.

When analysing categories of participants, two different cluster analyses were used. The primary reason for the use of cluster analysis is to find groups of similar entities in a sample of data. In Study I, a K-means cluster analysis was conducted to find groups who evaluated their study related goals similarly. K-means begins with a specified number of clusters and computing centroid observation for each cluster. Next, one by one it allocates each data point to the cluster that has the nearest centroid, and computes a new centroid for the cluster. This is repeated until all data points have been allocated a cluster. As a result, K-means procedure attempts to minimize the variance within each cluster (Aldenderfer & Blashfield, 1984). K-means has some limitations. First, with K-means, it is not possible to use statistical criteria for determining the number of clusters. Instead the researcher must decide the number (K) for clusters. Second, as conducted in Study I with SPSS, the researcher did not have control over which cases were chosen as centroids for each cluster.

Taking the issues with using K-means into consideration, in Study IV a latent profile analysis (LPA) was used to form homogenous subgroups based on students’ approaches to learning. LPA allows the researcher to partly statistically determine the number of clusters. Another advantage over K-means is that it is model based,
and generates probabilities of group membership (Vermunt & Magidson, 2002). This means that although each object is assumed to belong to one class or cluster, it is taken into account that there is uncertainty about an object’s class membership. It is also possible to test the models and to analyse their goodness of fit.

However, LPA is not a broadly used method and there is no wide consensus about its robustness. Bauer and Curran (2004) conclude that LPA is based on the same covariance matrix as factor analysis, and thus there is no need to distinguish between the two methods unless the research question is better approached from the latent profile perspective. They also emphasize that the use of LPA should be specifically argued in each case. In Study IV LPA enabled the exploration of combinations of clusters, disciplinary differences and perceptions of the learning environment, which would not have been otherwise possible. The results of the LPA were also highly similar to a K-means clustering conducted as a preliminary analysis (Parpala, 2010), which strengthens the robustness of the results.

3.1.2 Validity, reliability and legitimation

The two fundamental requirements of a quantitative measurement are validity and reliability (Kember & Leung, 2009). The validity of a measurement describes whether it measures what it is supposed to measure. Reliability describes whether a measure produces similar results under consistent conditions. In mixed-methods research this issue is addressed with legitimation (Nastasi, Hitchcock, & Brown, 2010), which reflects how well the study is implemented, whether the implemented quantitative and qualitative elements complement each other and justify the made conclusions. In this section, first the validity of the used measurements is evaluated followed by issues of reliability and thirdly issues related to legitimation.

While the list of all the different ways of approaching validity is extensive (see Joy, 2007), in educational research Richardson (2009) emphasises the importance of face validity, criterion validity, discriminative validity and construct validity. As this thesis used different measures in each study, which all were developed earlier, the focus here is to cover the essential aspects of validity in each study. Face validity examines the wording or structure of items and whether the participants understand them in the way they are supposed to be understood. This was especially in focus in Study III, when implementing the use of mobile phones as a means for data gathering. Students were interviewed before and after follow-up periods to ask them how they perceived the measurement and whether they saw a graph drawn from their answers as accurately reflecting their experiences. Criterion validity describes whether the scores of a measurement correlate with scores obtained with another independent criterion, such as study success. This was addressed in Study I where the main result was that those Theology students, who were committed to their study-related goals at the beginning of their studies, progressed more rapidly in their studies. Discriminative validity describes the extent to which an instrument gives different scores for groups of participants who would be expected to differ from one another. This was addressed in Study I by analysing how students who evaluated their goals differently also had different contents for their study-related goals. Further on students with different approaches to learning
in Study IV also differed in how they saw their learning environment. *Construct validity* is evaluated by examining the relationships among the scores of components of a measurement: It was evaluated in each study separately. Its main conclusions are presented in the following section.

To evaluate the construct validity of the used measurements, both exploratory (EFA) and confirmatory factor analysis (CFA) were used in this thesis. The difference between the two is that while EFA is used to uncover the underlying structure of variables, CFA can be used to examine a set of expected connections between variables. In other words, EFA is used to explore a structure, while CFA is used to examine a structure predefined by the researcher and its use has been suggested to increase the repeatability of used scales (Kember et al., 2004). In Study I EFA, a maximum likelihood factor analysis with a varimax rotation was used to explore the evaluations concerning study-related personal projects. The reason for using an exploratory approach is the nature of Personal Project Analysis (PPA), which although being widely used, has no fixed measurement, but rather is an approach adopted by each researcher for a specific purpose (Little, 2005). Thus, striving for confirming a structure was not sought and instead the focus was on exploring the structure. In Study II the CFA was conducted for the Higher Education Stress Inventory (HESI) (Dahlin, 2007; Lonka et al., 2008), which has been used earlier, but not in a Finnish setting. CFA was therefore performed to confirm the structure obtained with a Swedish version.

In addition to validity, the reliability of the used instruments was analysed in each study. In Studies I (personal goals) and III (emotional experiences), Cronbach’s alphas were used to evaluate the reliability of the used scales. In both studies, the alphas were over .70, which reflects a good reliability. Although Cronbach’s alpha gives a suitable lower boundary for internal consistency of a scale, it has been claimed that as a measure of reliability, it has many flaws, such as often giving a too low value (Sijtsma, 2009). Therefore in Studies II and IV more accurate measures of reliability were used. In Study II reliability was assessed using coefficient H (Hancock & Mueller, 2001), which measures the degree of replicability of a construct and is recommended to be used along with CFA. The construct reliability values ranged from 0.64 to 0.89 reflecting acceptable construct reliability. In Study IV General reliability (Tarkkonen & Vehkalahti, 2005) was used. It showed that the reliabilities of perceptions of the learning environment were at a good level (0.63–0.83), but concerning approaches to learning, surface approach the reliability measure was lower (0.56). In general the reliabilities of the used scales were acceptable.

In mixed-methods research the issues of validity are addressed with legitimation (Nastasi et al., 2010; Onwuegbuzie & Johnson, 2006), which address issues not associated with monomethod designs. As Study III represented most clearly, a mixed methods study, these issues are addressed according to the design of this study. Onwuegbuzie and Johnson (2006) address different types of legitimation, of which the three most crucial concerning this study are discussed here. *Inside-outside legitimation* reflects whether a study has been conducted by an insider in the population under study or an outsider researcher, because these two might have different views on the data. In this study, the first writer, who has been part of an
earlier similar study group, conducted the interviews. However, the analyses were done together with a teacher (Lasse Lipponen) of the study group, bringing together two different standpoints. However, both were partly insiders and the view of a complete outsider was lacking from the interview analysis. *Weakness minimization legitimation* reflects whether the strengths of the quantitative and qualitative methods are used to minimize the weaknesses of each approach. Although in Study III it could be argued that either the quantitative analysis or qualitative analysis could have been taken further to make them more fine-grained, the combining of the two to focus on experiences from two different data was best able to shed light on how students experienced the two different study periods. Thus, as such the study questions could be answered. *Multiple validities legitimation* refers to the extent to which all relevant research strategies are utilized and the research can be considered high on the multiple relevant “validities”. Validity of the quantitative approach issued with the CASS methodology using experience sampling with mobile phones enabled the minimization of a memorization error in the replies to queries. From the point of view of multiple validities, the two approaches also advanced the development of the used methodology. As this project progressed, the methodology also evolved. For example, during the second year, feedback images from the CASS data were constructed immediately after the follow-up and they could be used in the post-interviews after the two-week follow-up period raising the validity of the interview as a stimulated recall situation. Together the quantitative and qualitative analyses revealed a richer picture than a monomethod setting would have.

### 3.2 Limitations

This thesis focused on students’ experiences at different environments and experiences were measured at different levels. Because of the large area of focus it is obvious that there were blind spots left between the levels of measurement. The measurements of learning environment in Studies II (MED NORD) and IV (ETLQ) were conducted at a global level asking the students to evaluate their learning environment as a whole. Although MedNord was designed to measure medical students’ orientations and experiences in the medical school as a whole, ETLQ was originally developed to measure experiences at a course level (Entwistle & McCune, 2004). However, the Finnish translation was adopted to cover the global level (Parpala, 2010). As Pintrich (2004) reminds, students may use different strategies for different courses and perceptions of different courses certainly vary. Although the experience sampling in Study III complemented the global view with a focus on experiences in the situations, what is missing is the view of the middle ground conducted with a measurement adapted for the course level.

In general the response rates in the studies were satisfactory. In Study I (response rate 70%) and Study II (83%) the questionnaires were delivered on paper. In Study III mobile phones were used for data gathering (response rate 80%). However, in Study IV the response rate was rather low (33%), This was the only
study to use a web-based questionnaire, which is often related to low response rates (Lefever, Dal, & Matthiasdottir, 2007).

In this thesis data consisted of students’ evaluations and their experiences. It should be noticed that this limits the conclusions that can be made on the basis of the results. Although when appropriately evaluated students ratings of their own learning may have an acceptable validity (Richardson, 2009), students are not qualified to judge aspects, such as relevance of assignments or readings or the appropriateness of the instructors’ objectives. Student evaluations can be valuable indicators of their experiences, but for faculty development they are most useful when accompanied with a comprehensive data set with additional evaluation tools and a systematic programme for faculty development.

The studies in this thesis represented mostly a cross-sectional setting. In Study I, the measurement of study-related goals was conducted on first-year students and a follow-up on progressing in studies was done thereafter. In Study III students experiences were evaluated in their first and second study year, but the differences in the results reflected differences between the study periods and not developmental trajectories in their learning. Only the results of Study I indicate possible trajectories of successful or unsuccessful engagement with the learning environment starting from the beginning of the studies.

### 3.3 Theoretical Reflections

The main goal of this thesis was to explore how students experience their studies in different environments. Experiences were analysed at three levels: cognitive, motivational and emotional. These were defined respectively as the student’s relationship with the learning environment, study-related personal goals and emotional experiences at the learning situation.

The first main result of this thesis was that, in terms of study success best outcomes were related to experiencing stress, worry and exhaustion. Those students who had the highest achievements were the ones who also experienced moderate levels of stress, worry about competence and also to some extent exhaustion. Concerning goals, the results of this thesis seem to extend earlier findings concerning high-school students (Wentzel, 2000; Wentzel, 1989) to cover those in higher education about the favourable effects of perceived competence and commitment. Those in the Self-fulfillers and Committed clusters were progressing towards their goals, and they saw themselves as capable of achieving them. This coincides with findings among high-school students about the relationship between perceived competence and academic achievement (1990). On the other hand, the Self-fulfillers felt capable of achieving their goals, but were not progressing as well as the Committed students. Wentzel (1989) produced comparable results among high-school students, showing that it is particularly the commitment that leads to the best outcomes.

Although in earlier studies concerning university students (Salmela-Aro & Nurmi, 1997), low levels of stress have been associated with the best results, this was not the case in this thesis. The opposing results were replicated with both per-
son-centred (Study I) and variable-centred (Study II) methods concerning stress and exhaustion prospectively. In Study I the students who in addition to progress and capability perceived their goals as stressful, progressed most rapidly in their studies, and as such seemed to take their studies seriously. In Study II, exhaustion was positively related to academic self-concept, which measures how the student sees him- or herself progressing in studies when compared to others. Salmela-Aro and Nurmi (1997) used a single factor reflecting easiness to attain, low stress and positive evaluations to describe students’ evaluations. In a follow-up this factor was to subsequent academic achievement satisfaction. In Studies I and II, students’ evaluations were administered with multiple variables. Therefore, the more multifaceted methodological approach may have given a different picture.

Commitment to a learning process is related to raising one’s own standards to what is considered as an adequate level of achievement or learning. In successful engagement the emphasis one lays on the requirements set by the learning environment are successfully met. This raises the level of effort needed to meet those criterions and stress increases. This improves performance, but only to a certain point. It must be noted that too much stress is harmful. This was first specified in the Yerkes-Dodson law (Yerkes & Dodson, 1908), which states that the relationship between performance and arousal follows an inverted U. At first increases in arousal produce better performance, but when arousal exceeds too much there is a decline in performance. All in all, the results of this thesis lend support to the claim by Kember and Leung (Kember & Leung, 2006), that commitment is related to adequate levels of stress, while too much stress weakens performance.

However, what may be more important than the level of stress is what causes stress in the learning process. Lepine et al. (2004) found that stress associated with challenging tasks in the learning environment had a positive relationship with the learning performance, whereas stress associated with hindrances in the learning environment had a negative relationship with the learning performance. In other words, as long as stressful factors relate to aspects concerned with the object of learning, such as difficulty or amount of work, stress is better tolerated. It also seems that the role of stressful experiences may be different for different people. Although with some students increased anxiety increases their efforts and learning results, with some students the mechanism is the reverse resulting in poorer learning results (Pekrun, Hofmann, & Goetz, 2014).

Opposing successful engagement, the other side of engagement, an unsuccessful one was related to losing interest in one’s studies, which was also obtained with both person-centred and variable-centred methods. In Study I, the non-committed students had most goals focusing on studies outside their own faculty. In Study II, there was a negative relation between academic self-concept and lack of interest. These studies support the finding that if a student loses interest already during his or her studies, this will have unfavourable consequences for study success (Mäkinen et al., 2004) and chances are this will relate to well-being in a later career (Dahlin et al., 2010; Salmela-Aro et al., 2009). It should be noted that students who have a lower interest in their studies are probably not a homogenous group. According to Mäkinen-Streng (2012) unsatisfied students have multiple reasons for
their problems including disappointment with subject matter or career choice and experiencing the study environment as negative.

The second main conclusion of this study was that negative affects, experiences of high levels of challenge and exhaustion may be an essential part of the process of gradually learning to take responsibility for both individual and collaborative learning processes. The socio-cultural view emphasizes that participating and being a member in a professional community or a learning group is a crucial factor in reaching one’s full potential in learning (Bruner, 1996). The process of becoming a member of such a community is not merely about acquiring cognitive knowledge, but also about becoming acquainted with the tasks, terminology and practices of the surroundings (Lave & Wenger, 1991). If a student has been accustomed to being the object of teaching instead of being an active member of a learning group in a problem-based curriculum, the new environment requires the student to acquire new kinds of skills and approaches. For example, a new, more active role in setting learning goals and knowledge building is required. In addition, it poses a shift in how the student sees him- or herself as a learner. Directing one’s own learning process requires understanding, and meaning making that is procedurally different when compared to what is required at high school, which in Finland aims at a national matriculation examination. Self-directed learning requires the student to take responsibility for planning, implementing and even evaluating the results of learning (Vermunt, 2007). When all this is imposed on a novice higher education student without background in such learning activities, it is obvious that the experience may be overwhelming. In a laboratory setting it has been claimed that confusion can be beneficial for learning, and that it might be fruitful to design educational interventions that intentionally perplex learners (D’Mello, Lehman, Pekrun, & Graesser, 2014). Lonka and Ahola (1995) found that during a six-year follow-up students studying in an activating setting progressed slower at first, but were more successful in the long run.

In Study II, novice students (1st and 2nd study year) in a problem-based curriculum experienced higher levels of exhaustion than students in lecture-based curricula. No such differences were found between students in the later phases of their studies (3rd and 4th years of their studies). This indicates that the stressful experiences of a new learning method are indeed related to the initial phases of learning to operate in such an environment. In Study III, where students’ contextual experiences were compared during a lecture-based and inquiry-based period, students’ experienced more challenge and negative affects in the learning situations during the inquiry-based period. However, in the interviews they also emphasized positive experiences during the inquiry-based period, such as interest, excitement and successful collaboration in addition to the stressful and challenging ones.

A closer look at participants’ emotions during the two weeks with a sliding mean revealed a particularly problematic learning session, which was experienced as frustrating and challenging. Thus, it seems that the inquiry-based project was somewhat of an emotional rollercoaster with anxiety and optimal experiences taking turns one after the other. In an open-ended learning setting optimal experiences, or flow, is reached through anxiety and stress, and flow is not a static state, but a part in a dynamic fluctuation of experiences while focusing intensively on a chal-
lenging task (Csikszentmihalyi, 1990; Fave & Massimini, 2005; Inkinen et al., 2013). In the interviews both the positive and negative emotional experiences related to autonomy and collaboration. Järvenoja and Järvelä (2009) found that these are the most important aspects producing socio-emotional challenges in collaborative work. They are also the aspects that differentiate a self-directed learning process from a traditional setting in a school like environment, and thus the aspects with which students are likely to be most unfamiliar.

Vermunt and Verloop (1999) suggested that student regulation can be represented by a continuum ranging from very little to very high; similarly, the level of teacher regulation can be seen with a continuum from loose control to strong control. The original definition (Vermunt & Verloop, 1999) of friction between teacher-regulation and student-regulation of learning was later on extended to cover the relationship between the regulation of the learner and the learning environment (Linblom-Ylänne & Lonka, 1999; Linblom-Ylänne & Lonka, 2000). While friction traditionally refers to the regulation of the learning process as a whole, the results of this thesis imply that the interaction between the learner and the learning environment is more fine grained in nature. Based on the results of this thesis, I put forward the claim that friction should be defined more as situationally and momentarily elicited. The earlier definitions imply, if not explicitly the assumption that the friction during a specific learning process could be described as either constructive or destructive. They define constructive friction as a setting that keeps the student engaged in the learning process and offers suitable learning results for acquiring new knowledge and skills. However, this simplifies the dynamics taking place. In addition to this macro level disposition of defining the learning process as a whole, there is also the micro level of friction taking place during each learning session. A more representative description would be seeing the tension between the learner and the learning environment as changing from one situation to another. In some situations the level and skills in students’ self-regulation may be high, whereas concerning others they may be low. On the other hand, in some highly emotionally encumbering collaborative situations the regulation of learning has to make room for dealing with interpersonal relationships (Järvenoja & Järvelä, 2009; Näykki et al., 2014). To adequately give enough scaffolding, a teacher or the learning environment should offer resources to give support depending on the situation. Finally, as seen in Study III in an intensive learning process, even extreme experiences of frustration and excessive challenge may not be avoided. Instead of defining friction of a learning process as constructive or destructive, it would be more appropriate to talk about constructive and destructive elements, which take place and oscillate situationally during a dynamic process of learning.

There may also be different frictions or tensions between the learner and the environment depending on the observed level of the student experience. On the cognitive level of experience of the learning environment, the disposition reflects whether the student sees the environment as constructively encouraging to striving for a higher level of learning and accomplishment. On the motivational level, the student reflects, whether the learning environment offers adequate resources and possibilities to fulfil the student’s goals. On the emotional level, the interactions
and experiences in the learning situations evoke challenges and emotions that may either urge the student to focus harder on the task at hand or in the case of an excessive challenge to cope by giving up or avoiding the situation.

The results of this thesis lend support to the claim that the use of student-activating or student-centred methods may facilitate a shared and adaptive control of the learning process between the teacher and the learning environment. Students encounter challenging and stressful situations, where they are pushed to work at the upper limits of their skills and urged to gradually develop increasingly sophisticated thinking and study skills. During this process, participants change and develop new skills, which in turn affect the way the learning situations are experienced. Both such arrangements in Study II and III produced stressful experiences. In PBL (Study II) exhaustion was elevated only at the beginning of studies indicating that when progressing in their studies the medical students had acquired the essential skills to operate in a problem-based learning environment. In inquiry-based learning (Study III) experiences of challenge and negative affects were accompanied with rewarding experiences of success and importance. It is worth noticing that this relationship is not necessarily about the level of the challenge, but about the perceived challenge. This emphasizes the importance of positive experiences of succeeding in tasks (Lizzio et al., 2002; Trigwell et al., 2012) and satisfaction with teaching (Ramsden, 2005; Trigwell & Ashwin, 2006).

While raising the possible favourable effects of stressful experiences, it is worth mentioning that emotions and experiences are not just linked to academic achievements and approaches to learning. As Pekrund and Linnenbrink-Garcia (2014) emphasize, emotions are important outcomes in and of themselves. They are core components of individual identity and psychological well-being, and positive experiences during learning should not be undermined.

The third main conclusion of this thesis is that students’ experiences of their learning environment are not solely related to a single feature or even a set of qualities of the surrounding environment. The results of Study IV indicate that in addition to discipline or the qualities of the faculty, approaches to learning also have an effect on students’ experiences of the teaching–learning environment. How students perceive the learning environment is important, because it is related to their interests, attitudes to studying and approaches to academic tasks (Biggs & Tang, 2011; Entwistle & Ramsden, 1983; Shernoff, 2012). Based on Study IV, it seems that approaches to learning and perceptions of the learning environment cannot be fully separated. Instead they are both components in the relationship between the learner and the learning environment. However, and quite obviously, neither can the two be entirely explained by one another. The results of Study IV show that the characteristics of the faculty also play a role in how a student perceives the learning environment. Students adapt to the requirements and resources of the learning environment and a supportive environment is a prerequisite for successful learning. This view of approaches to learning and perceptions of the learning environment being two sides of the same phenomenon has been adopted in previous research (McManus, Keeling & Paice, 2004; Prosser & Trigwell 1999, p. 13). However, in majority of studies approaches and perceptions are considered to
be different entities, and acknowledging that they have a bidirectional relationship (e.g., Richardson, 2005; Biggs & Tang, 2011).

There has been an inconclusive debate about the effectiveness of activating teaching methods (Hmelo-Silver et al., 2007; Kirschner, Sweller, & Clark, 2006; Schmidt, Loyens, Van Gog, & Paas, 2007). Sweller et al. (2007) emphasized the need for randomized, controlled experimental tests of competing instructional procedures. They also emphasize that altering one variable at a time is an essential feature of a properly controlled experiment. However, the reasoning behind this argument assumes that changing one variable at a time would be possible. I support the opposite claim (see for example Cohen, Raudenbush, & Ball, 2003) that educational settings are situated and dynamically interactive, and not replicable entities, like those in natural sciences. For example, in a collaborative learning setting the affecting factors, include students’ backgrounds, teachers’ characteristics, individual learning goals, physical settings and evaluation methods. These are intertwined in a way that makes it impossible to separate or manipulate them individually. This is highlighted by the highly correlational nature of aspects affecting learning observed in Study IV; perceptions of the learning environment being related to qualities of the learning environment and also learning orientations, which in turn are related to emotional experiences and engagement during learning. Altering one variable in a laboratory-like setting may have unintended or non-measurable consequences for the ensemble of a student’s experiences and therefore it is difficult to test the specific effects of a single adjustment. Further on, even in successful educational experiments, it is often not clear which factor made the learning setting work.

The results of this thesis lend support to the claim that, instead of isolating the affecting factors, a more productive approach might be to take into consideration students’ experiences at different levels and focus on them with varying instruments. At the same time, it is advisable to carefully report the setting in order to enable comparing results from different studies.

One of the main features of undergraduate education is that it is usually confined within a single discipline. Different disciplines are associated with different views on the process of learning and teaching. It appears that lecturers in science departments are more likely to prefer formal, structured approaches to teaching and assessment; in arts and social sciences, teachers endorse more flexible and individualistic methods (Ramsden, 2005). The results of Study IV showed that students in hard sciences represented more organised approach to learning and students in soft sciences represented more Deep approach and less Surface approach. However, differences concerning perceptions of the learning environment were not as clear between the hard and soft sciences. Students’ evaluations are likely reflections of both the qualitative differences between faculties and about epistemologies, that is, differences in the knowledge base. Although Becher (1994) points out that discipline affects teaching and curriculum design, shifts in curricula such as the introduction of PBL beginning in the 1980s (Albanese & Mitchell, 1993; Schmidt, 1983) show that discipline does not determine the use of a specific teaching method.
Overall, the first main result of this study was, that experienced distress during a learning process is likely to be beneficial for study success, reflecting a strong commitment in studies. On the other hand, losing interest in one’s studies is likely to be detrimental. The second main result was that negative affects, experiences of high levels of challenge and exhaustion, are essential parts of the process of gradually learning to take responsibility for both individual and collaborative learning processes. Thirdly, it was found that the way students experience their learning environment is not related to a single feature, but is connected to both the approaches to learning and the qualities of the faculty, such as the used pedagogy. In addition to the theoretical reflections presented here, the results of this study impose many educational implications, which will be discussed in the following section.

3.4 Educational implications

Many studies have reported the so called Matthew effect, where positive experiences feed positive expectations, and lead to positive outcomes (Goetz, Frenzel, Hall, & Pekrun, 2008; Nurmi et al., 2003; Salmela-Aro & Nurmi, 1997). The same can be perceived for negative cycles (Nurmi & Salmela-Aro, 2002). Although the research settings of this thesis did not lend themselves to analysing such cycles, based on Study I, where those who were not committed to their study-related goals did not progress as rapidly as the committed students, we might be able to detect students who are likely to encounter problems. The results of Study I also highlight that the factors of successful or problematic commitment can be detected in the early phases of studies. Therefore, the earlier a student is offered counselling on how to deal with goal setting and plans about the future, the better. In fact, the results of this study are being utilized in study counselling in the Theological faculty at the University of Helsinki (Hirsto, 2011), where students are being supported in their career choices and encouraged to set themselves realistic goals.

The second main conclusion of this study was that negative affects, experiences of high levels of challenge and exhaustion are likely to be an essential part of the process of gradually learning to take responsibility for both individual and collaborative learning processes. As such, educational programmes should be designed to gradually increase the self-directed role of the learner. In problem-based learning, students are required to take a highly self-directed role at the beginning of their studies, but once they acquire the required skills and become accustomed to the conventions of the learning environment, the challenge level should be raised; thus, the students would be required to advance their learning skills. In some instances, study programmes are rather straightforward and do not require the student to take a self-directed role, and the first sections that require the learner to take responsibility relating to the thesis at the end of the Bachelor and Master phases of the study. At this stage, the sudden bewilderment of the requirements of independent work combined with the challenges caused by the writing process pose a great challenge for a student. Instead the gradual increase of self-directedness and a gradual lowering of scaffolding would provide a more fruitful environment in
which students could practice skills needed for self-directed learning. A collaborative learning group might also provide collaborative scaffolding to develop the skills of a self-directed learner. The role of stress is probably not evident for the learner and many students might also benefit from hearing that experiencing stress is not a negative thing, but an essential part of a challenging process of learning to learn.

The results of Study IV indicate that both approaches to learning, such as the level of learning skills, and the discipline affect students’ experiences of the teaching–learning environment. Thus, it becomes evident that improving the learning environment is not as simple as pulling a trick or two or improving a predefined set of well-defined aspects. If one conceives the perception of the learning environment as being closely related to approaches to learning, to change one is to change the other. Therefore, to make fundamental changes is not possible without taking both aspects into consideration. For example, when introducing a problem-based curriculum to a faculty, it is not enough to change the schedule and educate teaching staff. Without additional support for students’ about appropriate study habits and guidance to collaborative studying, the pedagogical reformation is likely to fail because the students lack essential basic skills. More emphasis should be placed on training the students to meet the often implicit demands of the learning environment; they should be taught how to set appropriate learning goals, how to cope with challenges and how to become an effective collaborator. Further on, if a student-activating education programme designed to teach students essential information processing and problem solving skills is being assessed with methods designed to measure memorizing facts, this leads to a contradiction. From the point of view of the student, he or she is graded on the basis of material that was not central during a course, and aligns his or her behaviour accordingly. As Biggs and Tang (2011) emphasize, assessment is a strong directive factor that affects what kind of goals students set and what and how they will learn. Therefore, a collaborative setting, such as problem- or inquiry-based learning should not be evaluated merely by focusing on individual achievements. An aligned setting with collaborative work assessed by focusing on joint accomplishments with self- and peer element reinforces collaborative learning, because the students can focus on what is best for the group’s learning and not on how to stand out as a skilled individual, which might be inconsistent with the goals of the group.

Not everyone accepts the view that student-activating methods have favourable effects. While some see them as giving essential skills for performing in future work life, others claim that they are expensive and ineffective. Studies focusing on their effectiveness have yielded contradictory results. Although in some studies active learning methods increase students use of deep learning and development in self-regulation skills (Case & Marshall, 2004; Sivan et al., 2000; Waters & Johnston, 2004), in some studies the opposite is sometimes true and students end up using more surface-level strategies characterized by memorizing facts without seeking the implications of what is learned (Baeten et al., 2008; Struyven et al., 2006). Meta-analyses on the results of problem-based learning (Albanese & Mitchell, 1993) have showed that when compared to lecture-based curricula, PBL students acquire better clinical problem-solving skills. This indicates that students
learn essential skills for taking responsibility for their own learning in student-activating settings.

The highly correlational nature of students’ perceptions and approaches to learning indicates that the two cannot be separated and are intertwined in a way that makes it impossible to change one without affecting the other. It becomes apparent, that implementing a successful student-activating course setting or curriculum is not a simple task. The level of the student’s skills and prior experiences must be taken into consideration, and the setting should be implemented in a way that the setting, learning materials and evaluation are aligned to support the aim of the studies. That is, the same course is different for students with different backgrounds, interests and skills. There is a danger that if the students do not experience the course as supporting their own learning or the demands are unclear, they become disengaged and focus on surviving the course without engaging in learning.

In the introduction it was argued that the three levels used in this study, perceptions of the learning environment, emotional experiences and motivational goals differ in their temporal positions reflecting past, current and future orientations respectively. Perceptions of the learning environment are constructed based on occurrences that have already taken place and therefore focus on representations of past experiences. Personal goals focus on what a person is trying to achieve or will be working on in the near future and therefore represent future aspirations. However, emotional experiences take place in the present. Interactions between these levels have been studied as relations between perceptions of the learning environment and motivation (Ramsden, 2005), emotions and approaches to learning (Trigwell et al., 2012), and emotions and motivation (Putwain et al., 2013). Although experiences on these three levels may be related, they are different in nature. On the basis of this thesis, these interrelated layers should be taken into consideration when planning a learning environment, because troubles in each one can cause problems for successful learning.

The learning environment should be constructive in requiring students to build on what they already know, to promote active learning and to reflect what they have learned. At the same time, it should be taken into account that if the student feels being unable to accomplish his or her personal goals within the learning environment, there is a danger that he or she will lose interest in studying, which may be detrimental. In the actual learning situation, students should be challenged, but offered adequate support to not be overstressed by the excessive challenge.

3.5 Future research

The strength of this thesis is the multiple approaches adopted, such as the varying research methods and focus on a wide spectrum of disciplines in different pedagogical settings. In addition to focusing on student’s conceptions and dispositions with questionnaires and interviews, the research also recorded real life practices and experiences with an experience sampling method. However, because of the large scale, interactions were not analysed in depth. Relations between different levels could be answered by asking questions such as: What is the relation between
students’ commitment to studying and experiences of the learning environment? Does commitment relate to positive experiences during studying? Do positive emotional experiences have an effect on what kind of goals a student sets for him- or herself?

Technological innovations accompanied with the popularity and affordable price of smart phones opens new lines for studying students’ experiences. For example, emotions have mostly been studied with various questionnaires (for review see Pekrun & Linnenbrink-Garcia, 2014), that usually focus more or less on retrospections of emotions. Short questionnaires that can be completed during a learning situation have also been developed (Pekrun et al., 2004) and questionnaires have been accompanied by videos and interviews (Näykki et al., 2014), and laboratory settings (D’Mello et al., 2014). However, the strength of an experience sampling method, such as CASS in Study III is that queries can be addressed with mobile phones. In addition to queries, it is also possible to add other ways of collecting data. In laboratory settings questionnaires have been accompanied with cortisol levels determined from saliva tests (Spangler, Pekrun, Kramer, & Hofmann, 2002) giving information about the physiological reactions to a situation. With mobile technology it would be possible to add information about heart rate or electrical conductance of the skin caused by sweat-induced moisture giving information about physical alertness and stress levels. This could be combined with location data, photos of the object of the activity, data about sleep cycle, physical activity or other sources of information. This might give new perspectives into students’ activities and experiences in their environment. This could shed light on how students recover from stressful experiences. Naturally, with the increasing possibilities of data collecting, the need for carefully considering appropriate research questions and the ethicalness of the setting increases as well. Other issues to be taken into consideration are the ease of use of the mobile research instruments and the burden that too much measurement can place on the participants.

A follow-up setting focusing on trajectories of successful or unsuccessful engagement with the learning environment starting from the beginning of the studies and focusing on important and helpful factors could be fruitful. Focusing on students’ overall quality of life, and perspectives into activities in their natural environments would open new lines of inquiry. Such focus could also show how students construct their engagement in their studies in the ensemble of projects in their lives including their relationships, personal lives, work life and student communities. Exploring the dynamics of different domains in students’ lives while they operate in their natural environment would increase understanding of the preconditions for powerful and engaging learning environments. This kind of follow-up could be expanded to cover the lives of the students after they graduate and move to working life. The main question remains, what kinds of skills and knowledge learned during higher education do students find useful after graduation and what kinds of learning environments would be effective in teaching these skills?
References


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References


