Kati Mäenpää

MOTIVATION REGULATION AND STUDY WELL-BEING DURING NURSE EDUCATION STUDIES
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Abstract

The purpose of this dissertation study is to gain an understanding of nursing students’ motivation regulation as a part of self-regulated learning during their study path. A further aim is to investigate how motivation regulation is related to students’ study well-being and their performance and to examine how it manifests in different learning environments in nurse education.

The study consists of three empirical sub-studies, which are reported in three articles (I–III). Substudy I and II longitudinally surveyed nursing students’ \( n = 90, n = 98 \) study-related motivation regulation and its association with study well-being (study engagement, study burnout) and academic performance in traditional on-campus and blended learning environments. Substudy III examined students’ \( n = 12 \) experiences of different motivation regulation strategies and factors enhancing the use of motivation regulation strategies during studies in a blended learning program. The dissertation used a mixed-method approach. The data were collected through surveys, register data, and interviews. Analysis combined quantitative and qualitative methods.

The results indicate that nursing students’ motivation regulation is versatile and adaptable. Students’ ability to regulate motivation varies individually, situationally and during different study phases. High-level motivation regulation is associated with higher levels of study well-being and performance than moderate, less-developed motivation regulation. Crucial motivation regulation strategies, particularly in a blended learning environment, are environmental structuring, self-consequating, goal oriented self-talk, efficacy management, emotion regulation, regulation of value, and interest enhancement. Several individual and situational factors enhance the use of these strategies.

This dissertation study provides a fine-grained understanding of the variability and personal aspects of motivation regulation and its tendency to change due to situational and individual factors. The outcomes shed light on the important role of a learning environment’s pedagogical policy on reinforcing students’ motivation regulation and study well-being. The findings would be useful to healthcare teachers and mentors and higher-education practitioners who are interested in enhancing students’ motivated learning and study well-being.

Keywords: blended learning, motivation regulation, nurse education, self-regulated learning, study well-being
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Tiivistelmä

Tämä väitöstitimus tutkii sairaanhoitajaopiskelijoiden opintojen aikaista motivaation säätelyä osana oppimisen itseääntelyä. Tarkoituksena on syventää ymmärrystä, miten motivaation säätely on yhteydessä opiskelijoiden opiskeluhyvinvointiin ja opintomenestykseen sairaanhoitajakoulutuksen oppimisympäristöissä.

Tutkimus koostuu kolmesta empirisestä osatutkimuksesta, joiden tulokset on raportoitu kolmessa artikkelissa (I-III). Osatutkimuksissa I ja II selvitetään pitkittäistutkimuksella sairaanhoitajaopiskelijoiden (n = 90, n = 98) motivaation säätyvät ja sen yhteyttä opiskeluhyvinvointiin (opiskelutilo ja opiskeluto-oppimuksesta) sekä opintomenestykseen perinteisissä ja monimuoto-oppi-
sympäristöissä. Osatutkimuksessa III tutkitaan sairaanhoitajaopiskelijoiden (n = 12) opiskelu-
tuken motivaatiosäätelystategioita käyttöä ja niihin vaikuttavia tekijöitä monimuoto-
opintojen aikana. Tutkimus on monimutkaisen ja sen aineisto koostuu yksityisistä ja opin-
tokeisterityyppistä sekä haastatteluita. Aineiston analyysissä käytetään sekä kvantittiaisia että kvalitatiivisia menetelmiä.

Tutkimustulokset osoittavat, että sairaanhoitajaopiskelijoiden motivaation sääty on moni-
puolista ja mukautuvaa. Opiskelijoiden kyky säädelä motivaation vaihtelee yksilöllisesti ja eri
oppimisilmiöissä sekä ajallisesti opintojen aikana. Korkeatasoinen motivaation sääty on yhtey-
dessä parempaan opiskeluhyvinvointiin ja opintomenestykseen kuin keskitasoinen heikompi
motivaation sääty. Erityisesti monimuoto-opinnoissa keskeisiä opiskelua tekevien motivaation
säätelystategioita ovat oppimisympäristön sääty, itsevakuuttelusta, emootioiden sääty, tavoite-
pyynnöllistamisesta ja yhteisöllisestä tehtävänhallinnasta, useamman tehtävän integroimisesta
ja tehtäväyrityksistä. Niihin vaikuttavia tekijöitä ovat myös henkilökohdittavat ja tilanne-
dependent tekijät, jotka vaikuttavat siihen, miten opiskelijat käyttävät oppimisympäristöä.

Tutkimus lisää ymmärrystä motivaation säätyyn vaihtelevuudesta ja henkilökohdaisuudesta, sekä sen hankkimiseen ja kasvattamiseen. Tutkimus aikoo mukautua ympäristölle ja opiskelijojen itse-
ääntelyyn ja opiskeluhyvinvoinnin tukemiseen. Tutkimus osoittaa, että oppimisympäristön vaihtelut ja pedagogisten käytäntöiden tärkeän roolin opiskelijoiden moti-
vaation säätyyn ja opiskeluhyvinvoinnin tukemisessa. Tulokset ovat hyödyllisiä terveydenhu-
thelijille ja opiskelijoille sekä korkeakoulutuksen toimijoille, jotka ovat kiinnostuneita edistämään
opiskelijoiden oppimismotivaatiota ja opiskeluhyvinvointia.

Asiakaslisto:
monimuoto-opiskelu, motivaation sääty, opiskeluhyvinvointi, oppimisen itseääntely, sairaanhoitajakoulutus
To my family
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This dissertation originated from my personal interest and will to develop education in my work as a teacher and guidance counsellor at a university of applied sciences. Particularly, I got interested when the nurse education was decided to convert into blended learning mode. However, the first roots for this certain interest date back 30 years. Already as a behavioral science master’s degree student I was immersed about students’ learning and tutoring in technology enhanced learning environments. This strong interest has led me to work within this area all along my teacher career and strive to be a researcher too. I have dreamed, that if I ever do a dissertation study, the aim would be related with this subject matter. The perfect time, topic and need for this study came now.

This doctoral journey has been exciting and full of enjoyment of learning for me. Getting the dissertation to this final point has demanded years of intensive and persistent work. The journey was not taken alone. Throughout this dissertation I have received a great deal of support and assistance from many people. They have made this journey possible and successful. Now, I want to look back and reflect on the people who have contributed to my doctoral path and acknowledge the most important to the process.

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In Oulainen, October, 2021

Kati Mäenpää
Abbreviations

BL blended learning
GPA grade point average
ECTS European Credit Transfer and Accumulation System
EFA exploratory factor analysis
EU European Union
f2f face-to-face
MR motivation regulation
OECD The Organisation for Economic Co-operation and Development
RN registered nurse
SRL self-regulated learning
STEM science, technology, engineering, mathematics
UAS University of Applied Sciences
WHO World Health Organisation
WM working model
List of original publications

This thesis is based on the following publications, which are referred throughout the text by their Roman numerals:


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Original publications
1 Introduction

The need for motivated healthcare students and workers who are predisposed to coping well in their demanding professions is widely recognized (Brand et al., 2017; Buchan, Shaffer & Catton, 2018; Lindqvist et al., 2014; Vanhaecht et al., 2020; Wilson et al., 2016) Today, nurse retention is acknowledged internationally as a critical societal challenge that should be addressed both in the workplace and education (Asakura, Asakura, Satoh, Watanabe & Hara, 2020; Bong, 2019; Buchan et al., 2018; Burmeister, et al., 2019; Dåderman & Basinska, 2016; Douglas, Bourgeois & Moxham, 2020; Efendi, Kurniati, Bushy & Gunawan, 2019; Gambino, 2010; Halcomb, Smyth & McInnes, 2018; Rose, 2011; World Health Organisation [WHO], 2020). Particularly, early career registered nurses (RNs) are at increased risk of leaving the profession due to motivational challenges and well-being problems, such as stress and burnout (Boamah & Laschinger, 2016; Bong, 2019; Chachula, Myrick & Yonge, 2015; Flinkman & Salanterä, 2015; Gambino, 2010). In Finland, the risk of nurses leaving the profession is particularly high: A higher percentage of RNs (about half) report their intention to leave their current position due to job dissatisfaction compared to the other Nordic countries of Norway (one-quarter) and Sweden (approximately one-third) (Aiken, Sloane, Bruyneel, Van den Heede & Sermeus, 2013; Lindqvist et al., 2014). Concurrently, nursing students and newly graduated nurses have been found to already suffer from a lack of motivation and high levels of stress both during their studies and work (Bartlett, Taylor & Nelson, 2016; Burthun, Azimirad, Saaranen & Turunen, 2019; Flinkman & Salanterä, 2015; Kaibling, 2020; McCarthy et al., 2018; Riley, Collins & Collins, 2019; Warrén Stomberg & Nilsson, 2010).

Recently, the pandemic crisis has increased the existing concern for healthcare workers’ and nursing students’ well-being (De Kock et al., 2021; Kim, Quijan, Sloan & Montejano, 2021; Vanhaecht et al., 2020; WHO, 2020). COVID-19 pandemic circumstances have been positively associated with higher levels of stress and anxiety among nurses and nursing students (Crowe et al., 2020; Kim, et al., 2021; Kochuvilayil et al., 2021; Savitsky, Findling, Ereli & Hendel, 2020; Usher, Wynaden, Bhullar, Durkin & Jackson, 2020).

In nurse education, learning takes place in different theoretical and clinical learning environments, and students are affected at the same time by the challenges of academic learning tasks and the demands of work-life situations. Becoming a competent RN calls for engagement in constant professional development, evidenced-based, critical thinking, and decision making (Sulosaari et
al., 2015). It requires working with various new health technologies, careful medication management, the promotion of safety among patients, and the provision of high-quality care in a variety of stressful, vulnerable, and unpredictable situations (Sulosaari et al., 2015; Toode, Routasalo, Helminen & Suominen, 2015).

At the same time, the learning environments within nurse education have been highly digitalized, and blended learning (BL), which combines online and offline learning, has rapidly become the new standard (Dziuban, Graham, Moskal, Nordberg & Sicilia, 2018; Jowsey, Foster, Cooper-Ioelu & Jacobs, 2020; McCutcheon, O’Halloran & Lohan, 2018). BL has been found to be useful, particularly in situations where nursing students are not able to study full-time on campus due to, for example, work duties, distance, or lockdowns (Jowsey et al., 2020; Li, He, Yuan, Chen & Sun, 2019; McCutcheon et al., 2018; Shorey et al., 2018). However, BL has also proven to be challenging because it requires from students even more active engagement and an independent ability to take responsibility for one’s own learning, in comparison to traditional, in-person, instruction-based education (Jowsey et al., 2020; Milligan & Littlejohn, 2016).

In light of these challenges, it can be argued that completing nurse education and working as a nurse are demanding tasks both in terms of learning and well-being. Due to these far-reaching personal, professional, and societal consequences, there is a clear need to support healthcare students’ commitment and ability to regulate their motivation and well-being. To better understand the challenges and needs healthcare students face during their studies, it is necessary to investigate nursing students’ motivational and well-being issues early in their educational paths.

This research addresses the current challenges and aims to increase research-based and theoretical understanding of the motivational mechanisms influencing well-being in a study-related context. Specifically, the focus of this research is on exploring nursing students’ motivation regulation (MR) during self-regulated learning (SRL) and its association with aspects of well-being while studying, such as study burnout and study engagement, as well as academic performance.

To scaffold nursing students’ SRL, nurse educators need to be aware of how to promote students’ MR and encourage students to engage in self-regulative processes. SRL in nurse education is not well understood (Robb, 2016). Prior research on the development of nursing students’ SRL, and MR in particular, is scarce, leaving us with an underdeveloped understanding of the development of such skills. A deeper understanding of nursing students’ self-regulative processes can help to improve the quality of educational programs offered to nursing students (Sanaie, Vasli, Sedighi & Sadeghi, 2019). The disclosure of nursing students’ SRL
strategies, such as MR, is important. The main mission of nursing education is to educate competent nurses who are able to learn the required knowledge, attitudes, and skills and to maintain and improve the health of others (Robb, 2016). At the same time, they have to engage in the work and cope with the challenging situations in complex healthcare environments (Li, Yu, Liu, Shieh & Yang, 2014; Robb, 2016).

In addition, while there exist plenty of studies on MR in other fields, there are fewer focused on the undergraduate health education context (Schwinger, Steinmar, Spinath, 2012; Smit, de Brabander, Boeakerts & Martens, 2017; Song, Kalet & Plass, 2016; Wolters, 2003a; Wolters & Benzon, 2013). We know surprisingly little about how to support nursing students’ MR and study well-being during nursing studies. In European countries, nurse education differs from many other professions because it has specific and strict professional regulations due the European Union’s (EU) training requirements for general care nurses (Directive 2005/36/EC; Directive 2013/55/EU). Therefore, we need field-specific and targeted research to understand different motivational patterns to promote learning, well-being while studying, and motivational preferences, particularly in requirement-based nurse education programs (Robb & Hunker, 2018; Rose, 2011).

To respond to these needs and the lack of relevant studies, this dissertation focuses on exploring motivational causation and the factors behind nursing students’ study well-being during studies in different learning environments. It explores what kind of MR occurs amongst students during nursing studies and what the relationship is between nursing students’ MR, study well-being, and performance in different learning environments. Moreover, it examines how nursing students’ MR strategies are enhanced by various factors in their learning environment, particularly in BL environments. Focusing on longitudinal research on nursing students’ MR throughout their education, this dissertation follows a consistent continuum. The mixed method approach makes it possible to gain a deep, nuanced understanding of MR in the nurse education context.
2 Theoretical background

Educating oneself to become a nurse is a reciprocal learning process in which knowledge, behavior, and motivation are persistently affected by challenging learning situations and constantly changing professional situations (Wilson et al., 2016). Motivation to learn is not always inherent, and it needs to be upheld and regulated in different learning situations (Linnenbrink & Pintrich, 2002; Virtanen, Nevgi & Niemi, 2015). To master learning and overcome challenges that may affect their study well-being, students benefit from the use of appropriate MR (Boekaerts, 2011). The promotion students’ MR and study well-being during their studies plays an important role in facilitating nursing students’ professional learning and competence (Sanaie et al., 2019).

This dissertation study is based on SRL. SRL is a comprehensive theoretical framework combining the effects of (meta)cognitive, behavioral, motivational, emotional, social, and environmental factors (Boekaerts, 1996; Pintrich, 2004; Wolters, Benzon & Arroy-Giner, 2011; Zimmerman, 2011). This dissertation contributes to research on the MR and study well-being aspects of SRL (Boekaerts, 2011; Wolters 2003a). MR is an integral part of a student’s adherence to successful SRL (Boekaerts, 2011; Pintrich, 2004). Successful self-regulated learners are able to monitor, activate, and sustain behavior, cognition, affect, and motivation, which are consciously targeted to achieve learning goals and master learning (Pintrich, 2004).

A large body of prior research has recognized the importance of motivation in nursing students’ studying and well-being (Buchan et al., 2018; Efendi et al., 2019; Kailhanen, 2020; McCarthy et al., 2018; Nesje, 2015; Rose, 2011). Although there are a variety of factors affecting nurses’ and students’ career intentions (e.g., salary, management) (Halcomb et al., 2018) and motivation is not the only factor influencing nursing students’ studying and career intentions, motivation during education has been found to play a role in the successful completion of nurse education programs and to relate positively to learning outcomes (Buchan et al., 2018; Efendi et al., 2019; Kailhanen, 2020; Rose, 2011). However, nursing students’ motivation and well-being is not typically explored in relation to learning; instead, it is explored in relation to physical, psychological, and social circumstances or in relation to students’ subjective satisfaction with specific matters (e.g., pedagogical method or environment) (Chen, Fan & Jury, 2017; Vik & Carlquist, 2018). Far too rarely is it examined with a focus on learning processes. In addition, earlier research on motivation mainly observes only generally nursing students’ motivational state.
or level in relation to different pedagogical interventions and does not delve deeply into the processes upholding motivation and learning, and thus into MR and its mechanisms.

Accordingly, the following chapters build upon this theoretical background, starting with the concepts of study-related well-being, study burnout, and study engagement. This background is expanded on further to include the theoretical grounding of MR and MR strategies as a part of the relevant SRL research literature. Boekaerts’ dual processing model of SRL (2011), which has an emphasis on the motivational and well-being aspects of learning, is used as a theoretical framework for combining the central concepts and conducted empirical studies. It allows nursing students’ study well-being, MR, and SRL to be scrutinized together in a learning environment context. This theoretical backgrounding will offer relevant perspectives on nursing students’ study well-being, MR, and learning in contemporary nurse education learning environments. The central concepts of this theoretical background are shown in Figure 1.

2.1 Nursing students’ study well-being

Students' well-being has been investigated in a number of different disciplines (Schmidt & Hansson, 2018). It can be defined and studied from a variety of
perspectives, ranging from physical (health), psychological, cognitive, and social perspectives to subjective and life-satisfaction perspectives (Chen et al., 2017; Davis & Hadwin, 2021; Organisation for Economic Co-operation and Development [OECD], 2017; Schmidt & Hansson, 2018; Stubb, Pyhältö & Lonka, 2011; Vik & Carlquist, 2018). Study well-being or the lack of it is associated with students’ ability to face different challenges, cope with adversity, and sustain resilience in academic settings (Etherton, Steele-Johnson, Salvano & Kovacs, 2020; Li & Hasson, 2020; Salmela-Aro & Upadaya, 2020; Schmidt & Hansson, 2018).

Nursing students’ study well-being has become an important issue in nurse education research, particularly concerning study burnout and study engagement and their associations with student retention and attrition (Bartlett et al., 2016; Flinkman & Salanterä, 2015; Kaiblingen, 2020; Riley et al., 2019; Warrén, Stomberg & Nilsson, 2010). Problems with nursing students’ study burnout and study engagement do not start when nurses enter their professional field, but rather begin and are present throughout their nurse education and have a direct influence on their learning and commitment to professional career development (Brown, Anderson-Johnson & McPherson, 2016; Turner & McCarthy, 2017).

In the present study, study well-being is defined in relation to the students’ learning and conceptualized as a measure of study burnout and study engagement (i.e., academic well-being) (Hietajärvi, Salmela-Aro, Tuominen, Hakkarainen & Lonka, 2019; Salmela-Aro, 2017, 2020; Widlund, Tuominen & Korhonen, 2018). Study burnout and study engagement are multidimensional concepts, comprising behavioral, affective, cognitive, and social elements (Salmela-Aro, Kiuru, Leskinen & Nurmi, 2009; Salmela-Aro & Upadaya 2012). Study burnout and study engagement represent opposite sides of students’ well-being in an educational context (Eccles & Roeser, 2011). They are both influenced by the learning environment (Salmela-Aro & Upadaya, 2020). By focusing on these two constructs as central indicators of study well-being, both negative and positive aspects of study well-being are examined (Salmela-Aro, 2017; Salmela-Aro & Upadaya, 2014; Widlund et al., 2018).

2.1.1 Study burnout

Study burnout is defined as comprising of exhaustion, a cynical and detached attitude, and feelings of inadequacy as a student (Salmela-Aro et al., 2009). Study burnout arises when a student is exposed to extensive and prolonged study-related stress (Salmela-Aro & Read, 2017). Study burnout raises the degree of emotional
exhaustion and cynicism together with feelings of ineffectiveness related to studies (e.g., Parker & Salmela-Aro, 2011; Salmela-Aro et al., 2009; Schaufeli, Martínez, Marqués-Pinto, Salanova & Bakker, 2002). The relationship between the burnout symptoms is complex (Bresó, Schaufeli & Salanova, 2011; Maslach, 2003; Parker & Salmela-Aro, 2011; Schaufeli & Taris, 2005). For example, exhaustion has been found to promote undergraduate university students’ cynicism and reduce efficacy in studying (Moneta, 2011). Exhaustion and cynicism are regarded as core dimensions and independent constructs of burnout (Bresó et al., 2011; Maslach, 2003; Parker & Salmela-Aro, 2011; Schaufeli & Taris, 2005).

Study-related exhaustion refers to the feeling of being emotionally overstretched in one’s studies (Salmela-Aro & Read, 2017). Moreover, it is considered a distinguishing symptom of study burnout, which is a result of perceived high study demands, overtaxing work, and related to feelings of inadequacy and the development of cynicism (Salmela-Aro & Read, 2017; Schaufeli et al., 2002). In nursing studies, emotional exhaustion in particular has been found to be a significant dimension of study burnout when predicting nursing students’ well-being (Ríos-Risquez, García-Izquierdo, Sabuco-Tebar, Carrillo-Garcia & Solano-Ruiz, 2018). Study-related exhaustion is also described as feelings of strain, stress, and chronic fatigue (Salmela-Aro & Read, 2017). Study-related cynicism, in turn, is more psychosocial in nature and refers to underestimation of and indifference or detached attitudes towards academic activities in general (including, for example, lessons, and schoolwork) and a loss of interest and meaning in studying (Salmela-Aro & Read, 2017).

Study burnout is acknowledged as common amongst Finnish higher education students (Salmela-Aro & Read, 2017). It has been widely acknowledged in the literature that nursing students, like nursing professionals, are vulnerable to different adverse factors that lead to study burnout (Bartlett et al., 2016; Bhurtun et al., 2019; Brown et al., 2016; Chernomas & Shapiro, 2013; Flinkman & Salanterä, 2015; Kaihlavan, 2020; McCarthy et al., 2018; Suarez, Asenjo & Sánchez, 2017; Turner & McCarthy, 2017; Warrén Stomberg & Nilsson, 2010). A number of nursing students have been shown to have an increased risk of developing burnout, as reflected in a lack of motivation and increased levels of stress during their studies, both in academic and clinical studies and when they are graduating (Bartlett et al., 2016; Bhurtun et al., 2019; McCharty et al., 2018; Flinkman & Salanterä, 2015; Kaihlavan, 2020; Timmins & Kaliszer, 2002; Warrén Stomberg & Nilsson, 2010).

In academic settings, nursing students’ stress is related to examinations, workload, continuous assessment requirements, and fear of failing to progress and
complete the studies (Barlett et al., 2016; Chernomas & Shapiro, 2013; Kaihlanen, 2020). Factors influencing study burnout in clinical placements include the gap between theory and practice, feelings of being unprepared for practice, fear of making a mistake, issues related to death and dying, witnessing suffering, problematic relationships within the clinic, and the feeling of being observed and evaluated (Chernomas & Shapiro, 2013).

Academic, clinical, and professional competence expectations, combined with the multiple demands of personal lives (e.g., financial strain, limited free time, family issues, and relationships), have been identified as primary sources of study burnout for nursing students (Chernomas & Shapiro, 2013). Study burnout and disengagement have been indicated as predictors of weak academic performance, occupational preparedness, and mastery in future clinical performance (Pitt, Powis, Levett-Jones & Hunter, 2012; Rudman & Gustavsson, 2012). In addition, study burnout has been associated with less utilization of evidence-based research in practice (Rudman & Gustavsson, 2012).

Nursing students’ study burnout is connected to a greater likelihood of dropping out, and evidence shows that study burnout can continue to develop during professional practice, thus leading to a decline in the nursing workforce (Chan & Perry, 2012; Reis, Xanthopoulou & Tsasousis, 2015). As a result, it has been suggested that nurse educators should actively approach students who are perceived as at risk (Shelton, 2012; Turner & McCarthy, 2017). Interventions focusing on reducing nursing students’ stress through curriculum development or improving students’ coping skills have been shown to have a positive effect on students’ well-being (Gibbons, Dempster & Moutray, 2011; Turner & McCarthy 2017). However, there is a need for more research into what kind of interventions are effective in promoting undergraduate nursing students’ study well-being (Turner & McCarthy, 2017). While nurse education is recognized as rigorous and challenging, it has been suggested that a greater emphasis be placed on the successful management of study burnout and the development of greater study engagement (Turner & McCarthy, 2017).

2.1.2 Study engagement

Engagement has been investigated largely in relation to work (Maslach, Schaufeli & Leiter, 2001; Schaufeli, Bakker & Salanova, 2006; Schaufeli, et al., 2002), but also in study-related contexts and, increasingly, in higher-education contexts in recent years (e.g., Ketonen et. al, 2016; Salmela-Aro, 2017; Salmela-Aro &
In a higher-education context, and in this dissertation study, study engagement is defined as a persistent and pervasive affective state that involves a positive academic state of mind characterized by vigor, dedication, and the effective absorption of knowledge (Salmela-Aro & Read, 2017; Salmela-Aro & Upadaya, 2014). Vigor is a measure of a student’s high energy, mental resilience, persistence, and willingness to invest effort in studying. Dedication entails a strong sense of involvement, inspiration, and significance that a student achieves through studying. Absorption, in turn, refers to a student’s full concentration and engrossment in studying. It manifests as a state of being enthusiastically and singularly focused on academic work. Absorption is experienced as feeling like time is flying and that it is hard to detach oneself from studying (Salanova, Llorens & Schaufeli, 2011; Schaufeli et al., 2002).

Study engagement is positively associated with better academic performance and well-being and lower levels of academic withdrawal and work avoidance (Kaplan, 2008; Salanova, Schaufeli, Martinez & Breso, 2010; Salmela-Aro & Upadaya, 2020; Schaufeli et al., 2002; Schunk & Greene, 2018; Tuominen-Soini & Salmela-Aro, 2014). Nursing students’ study engagement can be improved with high-quality teaching and tutoring (Gale, Ooms, Newcombe & Marks-Marau, 2015). Pedagogical strategies facilitating nursing students’ self-efficacy (Priesack & Alcock, 2015), peer learning (Ghasemi, Moonaghi & Heydari, 2018; Tower, Blacklock, Watson, Heffernan & Tronoff, 2015), and feelings of obligation and loyalty (Gambino, 2010) have been shown to contribute to students’ engagement and lower their stress levels. Moreover, activating teaching methods such as social interaction with peers and supervisors, team-based learning, homework and online task completion, lecture attendance, and study hours have been shown to improve study engagement and academic performance (Heggen & Terum, 2013; Mackintosh-Franklin, 2018).

In addition, a relationship between study engagement, MR, and emotions has been observed (Ketonen et al., 2019). For instance, the level of general study engagement was shown to predict how students evaluate the value of different course tasks (value appraisal). In the same study, engagement also proved to be related to the emotions that students associate with the experienced value appraisals. The research showed that study engagement may either strengthen or weaken the experienced emotions. The higher the perceived value of a specific task was, the stronger positive emotions were, and the weaker negative emotions were within individuals. In addition, higher levels of study engagement formed at the beginning of studies predicted students’ positive emotions long term. Even though there are
differences in students’ situational values and emotions, reasonable intervention efforts were recommended to facilitate higher-education students’ experience of the subjective value of the study activities in order to foster positive emotions and reduce negative ones (Ketonen et al., 2019).

Students may face difficulties engaging in learning (e.g., Azevedo & Cromley, 2004). Several studies have concentrated simultaneously on engagement and study-related burnout among higher-education students (e.g., Kunttu, Pesonen & Saari, 2016; Salmela-Aro, Moeller, Schneider, Spicer & Lavonen, 2016; Salmela-Aro & Read, 2017; Tuominen-Soini & Salmela-Aro, 2014). For instance, study burnout symptoms, such as increased levels of cynicism and inadequacy, have been found to expose students to reduced levels of study engagement and academic achievement (Kunttu et al., 2016; Salmela-Aro et al., 2009). A longitudinal study of Finnish higher-education students from universities and universities of applied sciences conducted by Salmela-Aro and Read (2017) uncovered four student profiles that were rather stable over time: Engaged (44%), engaged–exhausted (30%), inefficacious (19%) and burned out (7%). Both engaged and engaged–exhausted students were positively engaged in academic work but engaged–exhausted students experienced emotional exhaustion at the same time. Students fitting the inefficacious profile experienced heightened inadequacy, and the burned-out experienced very high cynicism and inadequacy and very low academic engagement. The results showed that although engagement was common in higher education, it has a negative side. Almost one-third of the students were identified as being exhausted by the engagement, particularly during the early stage of their studies. The trend demonstrated that study burnout (inadequacy and cynicism) increased, and study engagement decreased along with the number of years of study in higher education.

The findings of earlier research on study burnout and study engagement among higher-education students support the necessity of examining this field further. There is a particular place to reveal deeper understanding of the mechanisms that enable students to influence their study well-being. Prior research has addressed the reciprocal relationship between study engagement, SRL, and MR (Järvelä, Järvenoja, Malmberg, Isohätälä & Sobocinski, 2016; Kaplan, 2008; Schunk & Greene, 2018). Motivation enhances engagement and thus is related to the use of more adaptive MR strategies (e.g., setting mastery or performance goals) (Kaplan, 2008). Consistently, students who regulate their motivation remain more engaged in and are more successful at completing academic tasks than those who have not developed such strategies (Zimmerman, 2011).


2.2 Motivation and motivation regulation

Motivation can be defined from several theoretical viewpoints, such as attribution theory (Weiner, 1985), social cognitive model of motivated behavior (Bandura, 1986), self-determination theory (Deci & Ryan, 1985), interest theories (Hidi & Renninger, 2006), expectancy-value theory (Eccles & Wigfield, 2002) and goal orientation theories (e.g., Pintrich, 2000a). In SRL motivation and MR is typically described in relation to goals (e.g., Pintrich, 2000a; Boekaerts, 2011).

Motivation is seen as a crucial part of engaging in SRL (Boekaerts, 2011; Wolters, 2003a; Zimmermann & Schunk, 2011). Motivation leads learners to focus their attention, influences their choices, and increases their perseverance when solving problems and achieving challenging goals (Usher & Schunk, 2018). To succeed in SRL, students need both cognitive skills and motivational will power. Students who are motivated are described as having a strong interest in the subject or activity (Linnenbrink & Pintrich, 2002; Pintrich, 2000a). However, motivation in learning is a multifaceted phenomenon, and research on motivation highlights that it is not a static trait; rather, it varies in different situations, and students can be motivated in multiple ways, such as by their individual interest or social environment (Järvelä, Järvenoja & Veermans, 2008; Linnenbrink & Pintrich, 2002; Renninger & Hidi, 2011). Students are motivated to engage in study activities when they see them as a means to achieve or reach some desired outcome (e.g., mastering skills or getting good grades) (Sansone, Smith, Thoman & Macnamara, 2012). Several facets of motivation, such as goal setting and self-efficacy, have been identified as crucial predictors of successful SRL in higher and work-related education (Panadero, 2017; Sittzmann & Ely, 2011). Research has also emphasized the social nature of motivation and identified both individual and social contexts as important factors in students’ motivation (Järvelä et al., 2008; Pintrich, 2004; Renninger & Hidi, 2011). Wolters and his colleagues have described motivation in learning in this way:

Even the most skilled students may not do well if they have no drive to understand, no willingness to work hard, no sense that they can be successful, or no enthusiasm for the material or skills they are faced with learning. Almost as certain, unfortunately, is that students will often be faced with circumstances, of tasks, or contexts within which their motivation is stunted and inhibits their ability to achieve at optimal levels. (Wolters et al., 2011, p. 298)
MR refers to motivational power: Conscious thoughts and actions to initiate and sustain the desired behavior and engender significant behavioral change (Usher & Schunk, 2018; Wolters, 2003a). For example, positive valuation, positive outcome expectations, and self-belief (believing in one’s own efficacy) are likely to assist in maintaining sufficient motivation in learning (Usher & Schunk, 2018; Wolters, 2003a). MR is a complex cyclical metacognitive and social process that is influenced by situational contexts (e.g., learning environment or study phase) and social activities (e.g., collaboration or interplay) and involves adaptation over time (Hadwin, Järvelä & Miller 2018; Järvenoja, Järvelä & Malmberg, 2015, 2020; Pintrich, 2004). Students’ cognitive and personal characteristics, learning environment, and behavior interact in reciprocal ways in various social and situational learning contexts (Hadwin et al., 2018; Zimmerman, 1989). Thus, MR as a part of SRL is affected by social and contextual factors, and therefore varies depending on the learning situation (Engelschalk, Steuer & Dresel, 2017; Hadwin et al., 2018).

For students, effective MR is related to three key requirements: Knowledge of motivation, monitoring of motivation, and control of motivation (Wolters 2003a; Wolters & Benzon, 2013). Knowledge of motivation refers to learners’ meta-level understanding of the motivation and includes, for example, students’ motivational beliefs towards the studied domain or tasks. It also involves an understanding of how to apply motivational strategies effectively. By monitoring motivation, a student increases her awareness of motivation and ability to observe and collect feedback on their ongoing motivation while doing tasks. Students’ control of motivation refers to actual, purposeful implementations of how she intervenes and controls motivation. It includes the control of persistence, effort, and engagement when executing strategies for MR (Wolters 2003a; Wolters & Benzon, 2013).

Appropriate MR has been shown to support the use of cognitive and metacognitive learning strategies and academic success (Järvelä, Järvenoja & Malmberg, 2012; Sansone, Fraughton, Zachary, Butner & Heiner, 2011; Schwinger et al., 2012). In addition, advanced MR has been associated positively with mastery goal orientation (Song et al., 2016), valuing study content (Wolters & Benzon, 2013) and engagement in learning (Fried & Chapman, 2012; Wolters & Rosenthal, 2000). A number of different types of regulative strategies (e.g., attribution control, interest enhancement, and self-handicapping) that students may utilize to sustain or enhance their motivation to complete academic tasks have been identified in several studies (Cooper & Corpus, 2009; Sansone et al., 2012; Schwinger & Stiensmeier-Pelster, 2012; Smit et al., 2017; Wolters, 2003a; Zimmerman & Martinez-Pons,
Moreover, an instrument to assess a variety of motivational regulation strategies has been developed (Wolters, 1999; Wolters & Benzon, 2003a; Wolters & Benzon, 2013; Wolters & Rosenthal, 2000).

2.3 Motivation regulation strategies

Research has identified a set of theoretically consistent MR strategies, including goal-oriented self-talk, regulation of situational interest (interest enhancement), self-consequating, efficacy management, regulation of value, and environmental structuring (Wolters, 2003a; Wolters & Benzon, 2013). Table 1 (at the end of this sub-chapter) summarizes the described MR strategies and their relation to the theoretical references presented in this study.

One of the general commonalities across SRL theories is that goal setting triggers MR, and by using the specific strategy of goal-oriented self-talk, students self-regulate their motivation by emphasizing a particular goal or reason for completing a task or course (Boekaerts, 2011; Panadero 2017; Sitzmann & Ely, 2011; Wolters & Benzon, 2000). Students’ desire to reach various goals in learning is associated with completing tasks and thoughts or subvocal statements while they are engaged in academic activity (Wolters, 2003a; Wolters & Benzon, 2013).

Different achievement goal orientations have been found to be associated with students’ learning and aspects of study well-being (Pekrun, Elliot & Maier, 2006). Traditionally, two main constructs, mastery goals (with the aim of developing competence and deep understanding) and performance goals (with the aim of demonstrating competence, usually in relation to others) are seen as two underlying dimensions influencing engagement and learning in achievement contexts (Senko & Tropiano, 2016; Wormington & Linnenbrink-Garcia, 2017). Mastery goals are related to positive learning outcomes (see reviews by Rose, 2011; Vallerand, Pelletier & Koestner, 2008) and adaptive learning patterns (Conley, 2012) and have been shown to predict feelings of enjoyment of learning and hope and to hinder negative feelings of boredom and anger (Pekrun et al., 2006). Performance goals are related to more maladaptive learning behavior (Ikeda, Castel & Murayama, 2015; Vallerand et al., 2008). For instance, performance-avoidance goals have been related to anxiety, hopelessness, and shame (Pekrun et al., 2006). However, achievement goal orientation has also been considered in a more complex manner, from a multiple-goals perspective (Hulleman, Schrager, Bodmann & Harackiewicz, 2010; Senko & Tropiano, 2016). In this context, students pursue different goal
orientations simultaneously, and this has resulted in beneficial learning outcomes (Harackiewicz, Barron, Pintrich, Elliot & Trash, 2002; Linnenbrink, 2005; Pintrich 2006b; Senko, Hullemann & Harackiewicz, 2011; Senko & Tropiano, 2016). For instance, nursing students have reported the simultaneous use of mastery goal, performance-approach, and performance-avoidance goal orientations (Dunn, 2014; March & Robinson, 2015). For example, hopeful thinking (a belief in one’s ability to achieve desired goals) has been positively associated with both performance and mastery goals and the attainment of higher scores in nursing studies (Dunn, 2014; March & Robinson, 2015). Reducing performance-avoidance has been suggested to decrease fear of failure and anxiety before and during examinations. Consequently, this has produced better performance (Dunn, 2014; March & Robinson, 2015).

Similarly, interest enhancement strategy aims to boost motivation towards goals, but by making academic tasks more enjoyable and the materials more relevant to students’ personal interests (O’Keefe & Linnenbrink-Garcia, 2014; Wolters & Rosenthal, 2000). Activities that are not intrinsically interesting and not rewarding require more of this kind of effort to engage students (Hidi & Renninger, 2006; Reninger & Hidi, 2011). Students seek to increase their interest in what they experience while completing a challenging task (O’Keefe & Linnenbrink-Garcia, 2014; Wolters, 2003a; Wolters & Benzon 2013). For instance, while coping with a boring or repetitive task, students tend to increase their immediate enjoyment by thinking of the study tasks as some kind of game or relating the material to something they find interesting (Wolters, 2003a). Accordingly, in nursing studies, it has been found that game-based learning activities, such as digital simulation games and escape-room style teaching games, have produced positive outcomes for motivation and learning (Davidson & Candy, 2016; Gómez-Urquiza et al., 2019; Johnsen, Fossum, Vivekananda-Schmidt, Fruhling & Slettebo, 2018). Students have reported that gaming raised their level of interest, stimulated their learning by making it more fun and enjoyable, helped them with exam preparation, and engaged them in evidence-based practices (Gómez-Urquiza et al., 2019).

When using a self-consequating strategy, students provide and establish extrinsic consequences for their engagement and strengthen their perseverance and effort (Wolters, 2003a; Wolters & Benzon, 2013; Wolters & Rosenthal, 2000). Students can rely on self-provoked thoughts to manage their own behavior: They can, for example, identify and administer extrinsic reinforcements, rewards, or punishments for reaching study-related goals and completing tasks or failing to do so (Bandura, 1993; Schunk, 2009; Wolters, 2003a; Wolters & Benzon, 2013). A
student’s persistence enables a sustained effort to learn and concentrate on a task or situation despite boredom or failure experienced in progression towards a goal (Sitzmann & Ely, 2011). Self-consequating strategies have been positively associated with increases in student effort, performance, and general well-being (Wolters, 2003a).

Similar to the self-consequating strategy, the efficacy management strategy also aims to bolster effort and effective learning strategies (Wolters, 2003a). It involves thoughts that can be regarded as self-praising and self-reinforcing (Smit et al., 2017; Wolters, 2003a; Wolters, Won & Hussain, 2017). Efficacy management represents a significant form of MR and refers to students’ ability to monitor, evaluate, and purposefully control their own expectations, perceptions of competence, and self-efficacy in completing tasks (Wolters, 2003a; Wolters & Benzon, 2013). Self-efficacy is understood as a person’s belief in her ability to successfully cope with a task or situation (Bandura, 1993; Schunk, 2009). Students’ personal judgements of their own self-efficacy stem from earlier experiences, performance, and thoughts about their capability to implement behavior in different situations (Schunk, 2009). A student’s specific self-efficacy beliefs guide her appraisal of whether she will be successful at a given task or situation, for example in the role of a nursing student (Sanchez de Miguel, Orkaizagirre-Gómara, Ortiz de Elguea, Izagirre Otaegi & Ortiz de Elguea-Oviedo, 2019). An opposite approach is defensive pessimism, where students focus on their unpreparedness, lack of ability, or other factors to convince themselves that they are unlikely to complete a particular task or situation successfully (Wolters, 2003b; Wolters & Benzon, 2013). Self-efficacy has been tied to higher levels of study well-being, performance on academic tasks, less stress, and fewer incorrect attempts when solving problem (e.g., Bernacki, Nokes-Malach & Aleven, 2015; Orkaizagirre-Gómara, Sánchez de Miguel, Ortiz de Elguea & Ortiz de Elguea, 2020; Priesack & Alcock, 2015; Pryjmachuk & Richards, 2007; Sanchez de Miquel et al., 2019; Wolters & Rosenthal, 2000; Zimmerman & Bandura, 1994). In nurse education, enhancing self-efficacy has been shown to promote adaption to learning environments, understanding of new concepts (Kuiper, Murdock & Grant, 2010; McComb & Kirkpatrick, 2016), and students’ intention to use evidence-based practices (Ramis, Chang & Nissen, 2019). Moreover, students with high self-efficacy have reported setting goals that are higher than their previous performance levels, exerting more effort to learning, and persisting in stressful situations (Sitzmann & Ely, 2011). Promoting nursing students’ self-efficacy especially through pedagogical practices has proven effective, which has positive implications for students’ well-being,
engagement, and learning (Bandura, 1993; Linnenbrink & Pintrich, 2003; Sanchez de Miquel et al., 2019; Sarikoc, 2017; Shelton, 2012). Strategies that have been found to enhance medical and healthcare students’ self-efficacy are interventions such as effective induction, consistent timetabling (providing time for students to master academic and clinical skills), student control over learning and the curriculum, inclusive social events, good quality support, and positive role models in academic and clinical environments (Priesack & Alcock, 2015; Pryjmachuk & Richards, 2007; Ramis et al., 2019; Turan, Välcke, Aper, Koole & Derese, 2013).

One efficacy management tactic is proximal goal setting (Wolters, 2003a), which encourages students to break complex or large tasks into simpler, more easily and quickly completed segments in order to increase their motivation (Wolters, 2003a; Wolters & Benzon, 2013). In addition to this, students may also utilize time management strategies, such as making study schedules and monitoring their time and effort levels to meet task deadlines (Pintrich, 2004; Wolters, 2003). Procrastination is regarded as the opposite of time management, involving intentional delaying, despite the expectation that one will be worse off for the delay (Steel, 2007; Steel, 2010; Wolters, 2003b). Promoting students’ understanding and use of strategies for time management, especially setting goals and priorities, has been reported to reduce procrastination (Wolters et al., 2017). Additionally, increasing the perceived usefulness of timetables and being organized about time benefits students’ study engagement, learning, and performance. For nursing students, time management skills are crucial. Decision making by nurses is complicated by the stress and challenging demands of the work, and one of the major stressors they confront is perceived time pressure (Goldsby, Golsdby, Neck & Neck, 2020). Nurses’ ability to manage time pressure and, in turn, to make better decisions is essential and can enhance their performance and well-being (Gärling, Gamble, Fors & Hjerm, 2016; Goldsby et al., 2020).

Regulation of value refers to students’ conscious effort to stress the value and usefulness of the studied task or material (Eccles & Wigfield, 2002; Wolters & Benzon, 2013). Students may, for example, think up real-life situations in which it would be helpful for them to know the information or skill they are learning (Wolters & Benzon, 2013). Students gauge aspects of value, such as how beneficial, important, or personally relevant the material, content, or skill is for them right now or later on in work or in life (Wolters & Benzon, 2013). Linnenbrink-Garcia et al., (2018) developed a motivationally supportive undergraduate enrichment program for science, technology, engineering, and mathematics (STEM) students. In their study, the application of motivational theory to practice was found to be beneficial
for STEM students’ MR in terms of self-efficacy, persistence, and task value. It was particularly beneficial for STEM students with lower levels of achievement. The researchers suggested educational applications aimed at engaging STEM students and increasing task value, such as the inclusion of real-world, challenging tasks, provision of choice in academic tasks, encouragement of active involvement, support for feelings of belonging, and use of effort-based evaluation. In nursing studies, students have been found to value simulation-based courses and computer simulations for improving their knowledge, skills, and confidence (Cant & Cooper, 2014; Johnsen et al., 2018). These kind of digital learning environments constitute an e-learning resource that can provide healthcare students with an opportunity to practice their clinical reasoning and decision-making skills in a realistic environment without the risk of harming patients (Cant & Cooper, 2014; Johnsen et al., 2018).

Furthermore, concerning learning situations, students may apply an *environmental structuring* strategy, which aims to control the learning environment to reduce distractions and facilitate learning (Wolters, 2003a; Wolters & Benzon, 2013, Wolters & Rosenthal, 2000). Students may arrange and control the physical and/or social surroundings (e.g., the room, equipment, digitals tools, and level of social interaction) so that completing the task, homework, is easier and not subject to any interruptions (Järvelä et al., 2008; Järvenoja et al., 2015). Students can control distractions in many ways. For example, they can control when and where to study, or they can manipulate their own physical or mental readiness (e.g., they can study in the morning or evening, drink coffee, listen to music, etc.) (Wolters, 1998; Wolters & Benzon, 2013). Nursing students have been shown to take advantage of environmental structuring by arranging their learning space to be less exposed to interruptions and by utilizing peer support while studying (Xu, Du & Fan, 2013). Environmental structuring is seen as particularly necessary in BL environments, as students have control over where and when they study (Broadbent, 2017; Hsu & Hsieh, 2014; Smyth, Houghton, Cooney & Casey, 2012).

Despite the fact that *emotion regulation* was not included in the questionnaire developed by Wolters and Benzon, (2013), emotion regulation has been regarded as a significant aspect of regulated learning and teaching, in addition to MR (Ford & Gross, 2019; Gross, 2015; Hagenauer & Volet, 2014; Järvenoja, Järvelä & Malmberg, 2015, 2020; Jiang, Vauras, Volet & Wang, 2016; Smit et al., 2017; Sutton & Harper 2009; Wolters, 2003a). Students’ emotion regulation refers to their ability to regulate their emotional experience and feelings to ensure that they make an effort and complete tasks (Gross, 2015; Smit et al., 2017; Wolters, 2003a). For
example, students can use inner speech to control their affective reactions to calm down themselves. Emotional regulation is associated with a reduction in negative affective responses and the harmful effects of learning performance evaluations, but also with the control of positive emotions that help students cherish their learning (Wolters, 2003a). In nursing studies, students’ socio-emotional skills have been shown to have a positive influence on performance (Sánchez Expósito, Jiménez-Rodríguez, Díaz Agea, Carrillo Izquierdo & Leal Costa, 2019).

In addition, prior research has demonstrated a positive relationship between emotion regulation and engagement (Boekaerts, 2011). Emotional regulation has also been referred to as an inherent part of self-regulation in collaborative learning situations (Järvenoja et al., 2020; Salonen, Vauras & Efiklides, 2005). Students regulate motivation and emotion collaboratively during the learning process and in ever-changing learning situations (Hadwin et al., 2018; Järvelä, Järvenoja, & Malmberg, 2019; Järvenoja et al., 2015, 2018, 2020). The use of collaborative learning has helped students to create opportunities to regulate their individual emotions and motivation and also those of the group (Järvenoja et al., 2020; Järvenoja, Näykki & Törmänen, 2019).

To conclude, multiple motivational constructs underpin MR strategies. It is important to investigate different motivation strategies together because it provides insight into the differences between them and, further, into which strategies may be the most beneficial in instructional interventions (Karabenick, 2020; Wolters & Benzon, 2013). Therefore, considering MR, study well-being, and SRL together over the course of nursing students’ study path would improve our understanding of the role of MR in learning and students’ well-being in the context of nurse education.

Table 1. Summary of MR strategies and their theoretical references in this study.

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<th>MR strategy</th>
<th>Related to theoretical references (of motivation)</th>
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<th>MR strategy</th>
<th>Related to theoretical references (of motivation)</th>
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<tr>
<td>Regulation of value</td>
<td>Eccles &amp; Wigfield, 2002; Linnenbrink-Garcia et al., 2018; Wolters &amp; Benzon, 2013</td>
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### 2.4 Motivation regulation and study well-being in self-regulated learning

To bring together and consider aspects of nursing students’ study well-being, MR, and learning, this study leans on SRL theory (Boekaerts, 2011). A lot of research has been conducted and several models of SRL have been used to understand students’ learning, motivation, engagement, and achievement in multiple educational contexts from primary school to university and in many professional domains (e.g., Boekaerts & Corno, 2005; Dignath & Buttner 2008; Efiklides, 2011; Hadwin et al., 2018; Pintrich, 2000b; Wolters & Benzon, 2013; Wolters & Won, 2018; Zimmermann & Martinez-Pons, 1986). Typically, SRL is broken down into cyclical phases: Planning, monitoring, controlling, and reflecting (Panadero 2017; Pintrich 2000b; Zimmerman, 1989). Zimmerman (1989) has described SRL as a part of the social cognitive theory of behavior (Bandura, 1986), viewing self-regulation as an interaction between personal (e.g., monitoring and adjusting cognitive, affective, and motivational states), behavioral (e.g., observing the
methods of one’s learning) and environmental (e.g., observing environmental conditions) processes (Zimmermann & Schunk, 2011).

Successful self-regulated learners are described as skillful in setting and accomplishing effective learning goals and in monitoring and assessing their motivation in pursuit of their goals (Zimmermann & Schunk, 2011). They are competent in utilizing the feedback they have observed from their self-regulatory processes to improve their learning (e.g., to seek help, manage effort, persistence and modify strategies) (Karabenick & Zusho, 2015; Zimmermann & Schunk, 2011). They establish a productive learning environment for studying and sustain an appropriate sense of self-efficacy (Zimmermann & Schunk, 2011). In nurse education, SRL skills have been associated with greater academic performance, more effective thinking, and higher levels of self-efficacy in decision making when solving clinical problems (Sharples & Moseley, 2011; Whittaker, 2015).

However, students’ ability to self-regulate their learning is not always apparent (García-Pérez, Fraile & Panadero, 2020; Linnenbrink & Pintrich, 2002; Virtanen, et al., 2015). Even the skillful learners are exposed to individual and situational distractions, and they can find it difficult to internalise self-regulative agency in learning situations (Dresel et al., 2015; Usher & Schunk, 2018). Thus, it is worth learning how to improve self-regulation skills, as most of them do not arise on their own (Usher & Schunk, 2018). Understanding and promoting students’ SRL skills has become a widely recognized mission among educators and an important part of the development of instructional policies and practices aimed at improving students’ academic achievement (Dignath & Büttner, 2008; Graham, Harris, MacArthur & Santangelo, 2018; Usher & Schunk, 2018). Research has shown that implementing pedagogical activities that support students’ self-regulation and MR strategies can improve study well-being (Boekaerts, 2011; Grunshel, Schwinger, Steinnmayr & Fries, 2016; Schwinger & Stiensmeier-Pelster, 2012; Winne & Hadwin, 2012). Successful SRL can support professional development and increase study engagement and performance (Bresó, Schaufeli & Salanova, 2011; Bronson, 2016; Khalaila, 2015; Shelton, 2012; Wolters et al., 2017). Conversely, weak self-regulation skills may impede successful learning and performance and increase the risk of study burnout (Litmanen, Loyens, Sjöblom & Lonka, 2014). Thus, educators would benefit from insight into nursing students’ SRL and MR skills in particular in order to adapt their teaching and materials to provide students with adequate support in terms of motivated learning and study well-being in contemporary learning environments (Dörrenbächer & Perels, 2016).
The dual processing model from Boekaerts (2011) offers an applicable theoretical framework for understanding nursing students’ learning from different perspectives, namely from the mastery of learning perspective on one hand and from the perspective of coping with motivational and study well-being issues on the other hand. The model includes two different goal-processing pathways for a student’s learning: A growth pathway and a well-being pathway (see Figure 2).

![Dual-processing model of SRL](image)

**Fig. 2. Dual-processing model of SRL (Boekaerts, 2011) modified for this study’s context.**

In the center of the model there is student’s internal working model (WM), that refers to the student’s agency in SRL process. WM is connected to task in context and initiated by different purposes (Learning intentions and Affects). When the purpose is to expand the student’s learning intention, the student aims to master performance, to gain competence, knowledge, and skills and to maintain commitment to learning activities. According to the model, this type of learning
intention leads to the growth pathway. The growth pathway, in turn, contributes to (meta)cognitive strategy use (e.g., revision and critical thinking) in learning. This growth pathway is also called “top-down” self-regulation.

Concurrently, the student is exposed to different affects. They can be positive or negative affects. Affects may interrupt the student’s learning endeavors, and they can be experienced as threatening to the student’s well-being. Students tend to focus on preventing threats and harm to their well-being. This behavior leads to the well-being pathway and guides the student’s focus more to motivational beliefs (e.g., self-efficacy beliefs). This pathway is also called “bottom-up” self-regulation. (Boekaerts, 2011; Boekaerts & Corno, 2005).

When learning intentions or affects arise, they stimulate the student’s appraisals, which finally influence the student’s decision of the assessment in which direction the goal pathway is activated (Boekaerts & Niemivirta, 2000).

To supplement the model, MR can be regarded as important agent in the appraisal–assessment process. For instance, in the appraisal phase, the student’s perceived learning goals guide the student so that he regards a task as uninteresting or the context as somehow unsafe and threatening (e.g., it evokes a fear of failing or feelings of incompetence). This leads to decreased motivational interest and provokes a need to regulate motivation (e.g., through interest enhancement) to continue in the learning situation. Personal beliefs, feelings based on the experienced events, and MR skills have an effect on the assessment that the student makes and, finally, which pathway is activated.

As a second example, let’s imagine another scenario from a different perspective: A student who is strongly committed to her learning intentions and is already mastering skills well with (meta)cognitive strategies encounters a problematic situation—a challenge that reminds her of an earlier learning situation where she had failed. This shifts her focus to emotions like uncertainty, and the emphasis is now more on the well-being pathway, which directs the student to deal with motivational beliefs. For example, it can lead to low self-efficacy beliefs, and a student can lose her motivation and confidence in her ability to complete a task (Boekaerts, 2011). MR, in this appraisal–assessment process, moderates and influences on the shifts from the growth pathway to the well-being pathway and vice versa.

Learning situations can therefore trigger negative emotions like worry, anxiety, irritation, and disappointment and direct the student towards issues in the well-being pathway, such as study burnout symptoms. Negative emotional appraisals challenge the maintenance of motivation and initiate the use of MR (e.g., interest
enhancement and emotion regulation). But then, if the student is skillful in using MR strategies, they can protect her from repercussions and lead her back to the growth pathway. Thus, by utilizing appropriate MR, the student can shift back to the growth pathway during her studies (Boekaerts, 2011).

Conversely, if the tasks and situations in a learning environment align with the student’s goals and strengthen her interest and commitment to her studies, they evoke positive emotions. They enhance the feel-good state and strengthen study engagement (Salmela-Aro & Upadaya, 2014) and thereby encourage the student to concentrate on the growth pathway. In this case, motivational strategies are activated to support the mastery of knowledge and the acquisition of competence (Boekaerts, 2011).

The dimension of the SRL model (Boekaerts, 2011) called task in context is important because it allows also the motivational processes to be considered namely in context, thus, on a more situational level, rather than just as tasks. It allows us to think about nursing students’ tasks during studies in different situational contexts and the apparent MR in these situations. For instance, nursing students often encounter emotionally stressful situations during the clinical training period. At the same time, a student may have a heavy academic workload and challenging academic tasks to complete. The student could feel exhausted and not know how to manage this all. She would be susceptible to suffering from study burnout symptoms like exhaustion (Salmela-Aro & Read, 2017). The well-being pathway would be activated. To cope with this situation, the student might seek help from peers in their study group on an online platform. The peers could share similar feelings and cheer each other up (emotion regulation). They may decide to study together (environmental structuring) and plan how to complete the tasks in time (efficacy management). Together they could discuss and set goals and cope professionally with the stressful situation at their clinical placements (goal oriented self-talk). Now, the learning would be redirected, activated towards the growth pathway. Many situational aspects from the learning environment are actively present in MR and affect which pathway is activated.

Students can be guided by internal motivational factors, self-belief, and their own thoughts to pursue academic mastery on the growth pathway. Or they can be guided by situational factors, such as teaching practices, in the learning environment. Thus, the learning environment also plays an important role in students’ MR and influences study well-being and mastery of professional knowledge and skills (Boekaerts, 2011; Boekaerts & Corno, 2005).
2.5 Nurse education and learning environments

Nurse education in EU countries is based on the EU’s training requirements for general-care nurses and qualifies students as RNs (with a bachelor of healthcare) (Directive 2005/36/EC; Directive 2013/55/EU). Nurse education relies on European Qualifications Framework level six (bachelor level) (OECD, 2020). This level of education requires from a student higher-order professional learning. It requires advanced knowledge of a field of work or study, involving critical understanding of theories and principles. In addition, it demands advanced skills, demonstrated mastery and innovation, and the ability to solve complex and unpredictable problems in a specialized field of work or study. Moreover, it forces students to manage complex technical or professional activities or projects, take responsibility for decision making in unpredictable work or study contexts, and take responsibility for managing the professional development of individuals and groups (EU, 2017).

In Finland, nurse education programs require 210 European Credit Transfer and Accumulation System (ECTS) credits, including 90 compulsory ECTS credits for practical, hands-on training in clinical work environments (EU, 2021). It takes approximately three and a half years to graduate as a RN from a Finnish University of Applied Sciences (UAS). One year of full-time study corresponds to 60 ECTS credits (Ammattikorkeakoululaki 2014/932, Universities of Applied Sciences Act. 932/2014; Valtioneuvoston asetus ammattikorkeakouluiista 1129/2014). The Finnish ministry of education and culture regulates nurse education. A national agency, Valvira, which operates under the ministry of social affairs and health, provides licensing for RNs after their completed nurse education (Laki terveydenhuollon ammattihenkilöistä 1994/559). Nursing studies can be completed either in a traditional classroom-based learning environment or in a BL environment.

The global expansion of digitalization has rapidly incorporated technology-enhanced learning into undergraduate nurse education (Leidl, Ritchie & Moslemi, 2020; McCutcheon, Lohan, Traynor & Martin, 2015). Technological innovations such as simulation technology, digital teaching aids, and online and virtual learning environments have become an important part of clinical skills teaching (Leidl et al., 2020). The latest technological innovation in healthcare learning environments is “digital twins,” which are representations of a health product or service that allow students to monitor and examine medical issues (e.g., examine skin, ears, or the heart) remotely in a simulated way (Liu et al., 2019).
While educational and healthcare technologies have been combined in traditional classroom-based, face-to-face (f2f) learning environments, nurse education programs are more often based in a BL environment (Dziuban et al., 2018; Leidl et al., 2020). In recent years, the use of BL programs has increased exponentially and is currently seen as the new standard in nurse education (Jowsey et al., 2020; McCutcheon et al., 2018). There are currently a wide, varied, and expanding number of BL approaches, such as hybrid learning, flexible learning, and decentralized, distributed learning, being used in nurse education (Leidl et al., 2020). At the institutional level, in higher education, the transition toward BL and development of BL programs follows typically three stages: The awareness and exploration stage (e.g., need for change, baselines, testing practices, technologies, experiments), the adoption and implementation stage (embedding the new practices to curriculum) and finally maturity and growth stage (practices are acknowledged as a part of the formal education) (Graham et al., 2013).

In this study, BL refers to thoughtful blend of theoretical ground of learning, pedagogical methods, and technologies to optimize students’ learning in nurse education context (Cronje, 2020). BL is described as a form of pedagogy that combines appropriate practices from f2f classroom teaching, online learning, and technology mediated instruction, and where all learners are separated by distance some of the time, typically for half or more of the program duration (Garrison & Kanuka, 2004; Graham, 2006; Siemens, Gašević & Dawson, 2015). BL enables more accessibility and flexibility for students in how, when, and where they study and therefore provides them a greater level of independence to organize and control their own learning (Broadbent, 2017; Hsu & Hsieh, 2014; Smyth et al., 2012). In well-planned BL environment, flexibility empowers students to take ownership and manage their own learning within the offered BL opportunities and fit online studying around their work and family commitments (Smyth et al., 2012).

BL has been confirmed to add pedagogical value in terms of motivation and attitudes, student satisfaction, knowledge, communication skills and strengthening the connection between teachers and students (Kang & Seomum, 2018; Li et al., 2019; McCutcheon et al., 2018; Shorey et al., 2018). In addition, BL has been shown to contribute to students’ academic performance and engagement in studies (Kumrow, 2007; Smyth et al., 2012). It encourages the use of beneficial learning skills like problem solving summarization, and the creation of dialogue in online discussions (Peterson & Roseth, 2016; Smyth et al., 2012). A well-structured BL approach has been found to promote nursing numeracy skills confidence in undergraduate nursing studies (O’Reilly, Ramjan, Fatayer, Stundén & Gregory, 2018).
Overall, the use of online learning in teaching clinical skills is no less effective than traditional means in undergraduate nurse education (McCutcheon et al., 2015). Similarly, the use of advanced learning technologies, such as intelligent tutoring systems, learning analytics, artificial intelligence, virtual reality, and game-based learning environments, can facilitate students’ learning by scaffolding, fostering, and supporting self-regulative processes such as MR (Azevedo, Taub & Mudrick, 2018; Järvelä et al., 2016; Järvenoja et al., 2015; Mudrick, Taub, Azevedo, Rowe & Lester, 2017; Norberg, 2017). Motivation enhancement, such as firming up students’ achievement motivation (for example enhancing attainment and utility value) and self-confidence, has promoted the development of SRL skills and successful learning in BL environments (Isaam Al-hatem, Masood & Al-Samarraie, 2018; Vanslambrouck, et al., 2019).

However, there is somewhat contradictory evidence of BL environments’ ability to facilitate nursing students’ well-being and learning (Jokinen & Mikkonen, 2013; Jowsey et al., 2020; McCutcheon et al., 2015; Milligan & Littlejohn, 2016; Smyth et al., 2012). In fact, students can face challenges that hinder study well-being and learning in technologically advanced learning environments (Jowsey et al., 2020; Laine, Veermans, Lahti & Veermans, 2017). Engaging actively in the learning process is a key determinant of success in BL environments, and nursing students have found it challenging to engage with active teaching methods such as collaboration and online activities (Jowsey et al., 2020). In addition, students have experienced challenges such as feelings of isolation, uncertainty, and being overloaded; concerns about maintaining a sense of community; limited opportunities to get to know people; difficulties in multi-disciplinary sharing; time-management problems, technological problems; and the invasiveness of online learning in everyday life, which leads to a feeling of being overwhelmed and tiredness (Dacanay, Vaughn, Orr, Andre & Mort, 2015; Jowsey et al., 2020; Milligan & Littlejohn, 2016; Smyth et al., 2012).

While there is evidence that, overall, higher-education students can confront their difficulties in taking control of their studies and successfully regulate their academic motivation, it is likely that students find it hard to sustain motivated learning in BL environments (Broadbent, 2017; Koivuniemi, Panadero, Malmberg & Järvelä, 2017; Virtanen et al., 2015). Nursing students’ high levels of autonomy and responsibility in BL environments demand an even greater reliance on SRL and the motivation to implement self-regulatory skills (Broadbent, 2017; Smyth et al., 2012). Conversely, when self-regulation is not well-managed or controlled, BL has been shown to impact negatively on well-being in everyday life (Smyth et al., 2012).
Because of the heterogeneity of students’ SRL abilities, personalized support for developing and sustaining SRL skills is beneficial (Broadbent, 2017; Vanslambrouck et al., 2019).

Investigating how MR influences study well-being and learning performance in authentic academic learning contexts provides crucial insight into what kind of instructional interventions can best contribute to students’ motivation and study well-being during their education (Wolters & Benzon, 2013). There is a lack of research focusing on nursing students’ MR processes and their association with well-being issues, and this study fills that gap by examining students’ MR and study well-being during nursing studies in different learning environments. The present study aims to uncover advantageous implementations of MR within contemporary undergraduate nurse education.
3 Aims of the study

The overall aim of this study is to understand the motivational reasons behind nursing students’ study well-being. This is why this dissertation focuses on MR during nursing students’ education in traditional f2f and BL environments.

The study investigates how MR occurs and what the connection is between nursing students’ MR, study well-being and performance. Moreover, it aims to strengthen our understanding of MR enhancement and MR strategies in relation to the learning environment. There are three main questions addressed by this study:

1. What kind of MR occurs among nursing students during nursing studies? (see Sub-studies I, II and III)
2. What is the relationship between nursing students’ MR, study well-being, and performance? (see Sub-studies I and II)
3. How are MR and MR strategies influenced by the learning environment during nursing studies? (see Sub-studies I, II and III)

To answer these questions, nursing students’ MR and its association with study burnout, study engagement, and academic performance were studied longitudinally during nursing education in two different learning environments (see Sub-studies I and II). Sub-studies I and II relied on quantitative methods and data from questionnaires and a university’s administrative register. Sub-study III was qualitative and based on nursing students’ interviews regarding their experiences of MR in BL environment.
4 Methods

To explore MR, study well-being, and performance during nursing studies, this dissertation used a longitudinal study design and a mixed method approach (Creswell & Plano Clark, 2018). The methodological choices were made with the intent to reach a rich and deep understanding of nursing students’ MR and its appearance, progress, and associations with different factors in a nurse education context. The study was practice-oriented and developed as a continuum in which each phase of data collection and analysis benefited from the previous phase of data collection and analysis.

This chapter describes this study’s context, participants, research design, and methods of data collection and analysis. Also, the ethical and methodological considerations and the limitations of the study are explained. A more detailed description of the procedures and individual study designs can be found in the original articles (see Articles I–III).

4.1 Study context

The context of this study was undergraduate nurse education at the UAS in northern Finland. In this study, participating nursing students represented two different programs, a traditional, on-campus program, and a BL environment program. Following the EU’s training requirements (Directive 2005/36/EC; Directive 2013/55/EU) for general-care nurses, all the educational requirements were the same in both programs. The education qualifies students as RNs (with a bachelor of healthcare). A secondary general or vocational education certificate (or sufficient corresponding studies) was required for admission into the nurse education programs. The final student selection was based on earlier study success or the university’s entrance examination (Universities of Applied Sciences Act. 932/2014, Valtioneuvoston asetus ammattikorkeakouluista 1129/2014). It takes approximately three and a half years to become a RN in both programs (210 ECTS credits). The clinical training periods were equal in both programs (90 ECTS credits). The grading in the studies was based on the ECTS scale, which ranges from one to five, with one indicating an adequate grade and five indicating excellent performance (5 = excellent, 3–4 = good, 1–2 = satisfactory, 0 = fail).

In this study, the students in the traditional learning environment program participated in f2f classroom teaching on campus regularly every week and took part in clinical training periods at practical placements during the semester. The BL
The environment was designed to combine online learning, face-to-face teaching, simulation practices, and clinical training periods. The BL program comprised 4 or 5 days per month during the first year. In the second and third years, the amount of face-to-face classroom teaching was slightly lower, due to more frequent clinical training periods. Otherwise, they studied flexibly and remotely, according to the online curriculum in tutored and web-based learning management systems, which included individual coursework and collaborative learning situations and tasks. For example, students were given assignments that required them to study collaboratively in their long-term study groups. The two learning environments of this study are illustrated in Figure 3.

Fig. 3. Traditional and BL environment models in undergraduate nurse education.

4.2 Participants

The same nursing students were followed in the three sub-studies. The sample in the first two sub-studies consisted of two cohorts of participants: (a) nursing students studying in a traditional learning environment and (b) nursing students studying in a traditional learning environment. The participants in the blended and traditional groups comprised studying and peer learning both online and in face-to-face learning situations.
studied at two separate campuses, though they were in the same nursing degree program, which began in August 2015.

In Sub-study I, the participants were 90 first-year baccalaureate nursing students (73 female, 17 male, mean age 28 years). Thirty-four students studied in a BL environment, and 56 studied in a traditional learning environment. In the BL group, 73.5% (n = 25) were working during their studies, and in the traditional learning group, 69.9% (n = 39) were not working during their studies. The response rate was 85.7% (N=105).

In Sub-study II, the sample consisted of 98 second-year nursing students (83 female, 15 male, mean age 28 years). Thirty-four of the participants studied in a BL environment, and 64 students studied in a traditional learning environment. In the BL group 64.7%, (n = 22) of the students were working, whereas in the traditional learning group, 54.7% (n = 35) did not work during their studies. The response rate was 90.7% (n = 98, N=108). The value of the same participants for both the first and second survey was n = 69. The longitudinal data in Sub-study II were analyzed using a value of n = 69, whereas the cross-sectional data of n = 98 was used in all other analyses in Sub-study II.

In Sub-study III, the interviewed students were selected from the same BL environment group. The participants included 12 (7 female, 5 male, mean age 32.5 years) third-year nursing students. They were all near the end of their studies. Three (n = 3) of them were currently graduating and nine (n = 9) were graduating within the next six months.

The interview participants were selected based on voluntary participation and their representation of all the different types of MR profiles detected in the earlier Sub-study II. The researcher contacted the students personally by phone (either via a call or text message) to inquire about their willingness to take part in the interview. The volunteer interviewees represented four different types of MR profiles, as follows: 1) four students represented a permanently high-level MR profile, 2) four students represented a permanently less-developed MR profile, 3) two students were MR profile changers who had shifted from a high-level to a less-developed MR profile, and 4) two students were MR profile changers who had shifted from a less-developed to a high-level MR profile.

4.3 Research design

The research design was longitudinal, including three measurement points over three years. The design applied a mixed-method approach consisting of a set of
quantitative and qualitative methods (Caruana, Roman, Hernández-Sánchez & Solli, 2015; Creswell & Plano Clark, 2018; Hassett & Paavilainen-Mäntymäki, 2013; Menard, 2002; Ployhart & Vandenberg, 2009). In this research, prospective and retrospective longitudinal designs were joined together, and mixed-method designs quantitatively collecting follow-up data and qualitatively collecting interview data supplemented each other (Menard, 2002). Accordingly, nursing student participants from traditional and BL environment groups were initially followed for two years. The same quantitative surveys were conducted in the first and second years of the participants’ education. In the third year of nursing studies, qualitative data were collected from a sample of the same participants in BL group. The data were collected retrospectively, at the end of their studies, in interviews with them about what they had experienced during the three years of their education. This study consists of three sub-studies and articles, and the general research design is illustrated in Figure 4.

**Fig. 4. Research design.**

The longitudinal design allowed for the exploration of situational changes in MR, study well-being, and performance over time and the identification of consequences and trends (Caruana et al., 2015; Menard, 2002). This study’s analysis involved a comparison of the data collected during the two time periods and consisted of measurements of differences and changes in variables from one period to another.
A mixed-method approach was used because a one method perspective, quantitative or qualitative data alone were not sufficient to fully answer the set of research questions regarding the dynamics of nursing students’ MR and its relationship to other factors. Explicitly, to answer to the research questions what kind of MR occurs among nursing students during their studies and what is the relationship between MR and other factors, the quantitative methods were found most appropriate. To obtain understanding to how MR and MR strategies are influenced by the learning environment during nursing studies, the qualitative methods were found most workable. This study utilized a practice-oriented research design whereby quantitative and qualitative components could be interlinked during the research process to produce multifaceted data and understanding of the research questions (Creswell & Plano Clark, 2018; Johnson, Onwuegbuzie & Turner, 2007; Teddlie & Tashakkori, 2010). The mixed-method approach enabled a pragmatic understanding of the results and the supplementation of results that were gained with one method with the results of the next research phase (Johnson & Onwuegbuzie, 2004). The chosen approach helped the researcher notice disagreements and different viewpoints within the results and draw conclusions accordingly (Johnson & Onwuegbuzie, 2004).

Mixed-method design was found adequate due to conveniency and strengths that can compensate the weaknesses of both quantitative and qualitative research (Creswell & Plano Clark, 2018). For example, quantitative research was seen weak in understanding the contextual issues in which participants are and capture the real voices of participants. Further, qualitative research was seen deficient because the limitation in the number of participants, difficulty in generalizing and comparing the findings and the possible bias by personal interpretations made by the researcher. Thus, mixed-method design allowed to use all the tools of data collection available, offered pragmatist perspective, provided more comprehensive evidence for to studying the research problems and encouraged researchers to collaborate across quantitative and qualitative approaches (Creswell & Plano Clark, 2018).

In this study, the quantitative and qualitative parts had a fairly equivalent status in relation to the research questions and interpretation of the results. The first two sub-studies (Sub-study I and II) were quantitatively driven and focused on discovering the overall state of the nursing students’ MR and the progress of their MR profiles over time and their relationship to study engagement, study burnout, academic performance, and the learning environment. The third study (Sub-study III) had a qualitative research design and focused on gaining a deeper understanding of the nursing students’ MR strategies in a BL environment. An
overview of the study design, participants, data collection, and analysis methodologies is presented in Table 2.

**Table 2. Overview of the study design and methodologies.**

<table>
<thead>
<tr>
<th>Sub-study / Article</th>
<th>Participants</th>
<th>Time</th>
<th>Data</th>
<th>Focus</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-study I / Article I</td>
<td>Nursing students in blended and traditional groups ((N = 90))</td>
<td>2016</td>
<td>Questionnaire, register data Entrance examination</td>
<td>The underlying structure of the variables of the MR, study engagement, and study burnout MR profiles Differences between clusters in study engagement, study burnout, and entrance examination; differences in MR, study engagement, study burnout between BL and traditional groups</td>
<td>Explorative factor analysis (EFA) K-means cluster analysis Independent-sample t-tests, nonparametric tests</td>
</tr>
<tr>
<td>Sub-study II / Article II</td>
<td>Nursing students in blended and traditional groups ((N = 98))</td>
<td>2017</td>
<td>Questionnaire, register data: entrance examination, grade point average (GPA), credit units</td>
<td>The underlying structure of the variables of the MR, study engagement and study burnout MR profiles Differences between clusters and groups; differences between the first and second measures; relationship between MR subscale scores and GPA and between entrance examination and GPA</td>
<td>Explorative factor analysis (EFA) K-means cluster analysis Independent t-tests, repeated measures t-tests Linear regression analysis</td>
</tr>
<tr>
<td>Sub-study III / Article III</td>
<td>Nursing students in the blended group ((n = 12))</td>
<td>2018</td>
<td>Retrospective interview</td>
<td>Understanding MR strategy use and factors affecting MR strategy use during studies in a BL environment</td>
<td>Content analysis</td>
</tr>
</tbody>
</table>
4.4 Data collection

In this study, three methods were utilized in data collection: Questionnaires, register data, and interviews. Sub-studies I and II focused on characterizing the overall state and progress of nursing students’ MR profiles and their relationships with study engagement, burnout, and academic performance in both learning environments during the first two years of nursing studies. To capture this data, a questionnaire and register data were utilized in Sub-studies I and II. In Sub-study III, interviews were conducted to deepen the researcher’s understanding of nursing students’ MR strategy use over three years in a BL environment. A summary of the materials, data collection, and analysis in the sub-studies is presented in next paragraphs and in Table 2.

4.4.1 Questionnaire

The implemented questionnaire consisted of three scales, including the MR scale (Wolters & Benzon, 2013), the study engagement scale (Schaufeli, Bakker & Salanova, 2006; Schaufeli et al., 2002), and the study burnout scale (Maslach et al., 2001; Salmela-Aro, et al., 2009; Salmela-Aro & Näätänen, 2005). To assess each item, a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7) was used. All the scales have been validated in earlier studies, and the Finnish version of the scales were used in the data collection. In addition, the questionnaire included four background questions regarding age, gender, employment status, and whether participants had underage dependents. The scales are described in the following paragraphs and the full scales can be found in Articles I and II.

To explore participants’ MR, the MR scale included 26 items and five subscales: 1) regulation of value (six items, e.g., “I think up situations where it would be helpful for me to know the material or skills.”), 2) regulation of performance (five items, e.g., “I remind myself about how important it is to get good grades.”), 3) self-consequating (five items, e.g., “I tell myself I can do something I like later if right now I do the work I have do get done.”), 4) environmental structuring (four items, e.g., “I change my surroundings so that it is easy to concentrate on the work.”), 5) regulation of mastery goals (six items, e.g., “I challenge myself to complete my work and learn as much as possible.”) (Wolters & Benzon, 2013). The MR scale used in this study was validated by Wolters and Benzon (2013).

The study engagement scale comprised 9 items and three subscales: 1) vigor (three items, e.g., “In my studies, I feel strong and vigorous.”), 2) dedication (three
items, e.g., “I find studying full of meaning and purpose.”), 3) absorption (three items, e.g., “When I am studying, I forget about everything else around me.”). The study engagement scale was based on a shortened version of the Utrecht work engagement scale–9 (UWES–9), which was validated by Schaufeli, Bakker and Salanova (2006), and Schaufeli, Martinez, Marqués-Pinto, Salanova and Bakker (2002).

To investigate participants’ level of study burnout, a scale based on the school burnout inventory was used (Salmela-Aro, et al., 2009). The study burnout scale consisted of subscales for exhaustion and cynicism that were validated in earlier research by Maslach, Schaufeli and Leiter (2001), Salmela-Aro, Kiuru, Leskinen and Nurmi (2009), and Salmela-Aro and Näätänen (2005). The exhaustion subscale included five items (e.g., “I feel overwhelmed by my schoolwork.”), and the cynicism subscale included three items (e.g., “I’m continually wondering whether my schoolwork has any meaning.”).

The data in Sub-study I were collected via the questionnaire in February 2016. As of this first measurement point, the students had studied for half a year. Sub-study II was performed in February 2017, which was approximately halfway through the students’ study program. Both surveys were conducted separately by the researcher at the beginning of a lecture in both the traditional and BL groups. It took approximately 15–20 minutes to complete the survey. An online survey was sent to students who did not attend the lecture. The students’ email addresses were obtained for the online survey from the university’s administrative database.

4.4.2 Register data

The purpose of the register data was to indicate students’ academic performance. Register data were collected by the researcher from the university’s administrative database in spring 2016 for Sub-study I and in spring 2017 for Sub-study II. To measure academic performance, students’ entrance examination scores (for Sub-study I and II), GPA for their completed courses, and total number of completed credits (for Sub-study II) were utilized. The GPA of all of the students’ grades was measured at the second measurement point in spring 2017.

4.4.3 Interview

In the third sub-study (Sub-study III), the data were collected via interviews. The aim of the interviews was to map and understand nursing students’ experiences of
using MR strategies during their study path and in different learning events in BL. The conducted interviews were semi-structured (Corbin & Morse, 2003; Fontana & Frey, 2000) and had no strict question format or order so as to capture students’ own descriptions of their study paths (Kvale, 2007). The interview themes focused on the events that had influenced students’ MR, and the themes were introduced using key questions and prompts when necessary. The interviewer had a supplemental question sheet that included ten questions on MR (see Appendix 1, in Article III) to ensure that all of the study’s areas of interest were covered in each interview. The thematic interview allowed interviewees to use their own terminology and definitions in their descriptions. The interviewees’ own words choices, especially concerning MR, provided information relevant to the study’s goal of analyzing the use of MR strategies and factors related to maintaining and enhancing MR in different study phases.

The thematic interviews were conducted by the researcher using a retrospective approach in spring 2018 (March–May). The participants were interviewed face-to-face and individually in a quiet room on campus or at the students’ practical placements at clinics. The interviews ranged from 45 minutes to 1 hour and 40 minutes.

To start the interview, the participants were asked to draw a visualization of their study path as they saw it. They were asked to recall and reflect on their entire three-year study path. The participants freely drew a visualization (e.g., an informal figure, path, timeline, or mind map; see Figure 5) of their study path, marking in crucial events that had an influence on their learning. The marked events could have had either a negative or positive influence. After the visualization was completed, the researcher began to interview the participant with the aid of the visualization. This visually stimulated recall method corroborated inferences from memory traces by prompting the researcher to ask participants to recount their thoughts and actions (e.g., “What did you think or do when you confronted this situation?”).
The interviews followed themes and questions that focused on strategies for the self-regulation of students’ motivation. The researcher asked the participants to choose the events freely in that order they wanted to talk and describe how the events had influenced their studies and their regulation of motivation (Wolters & Benzon, 2013). The participants were not asked straightforwardly about the use of any specific MR strategy. Instead, they were asked to report their overall tendency to respond to motivationally challenging situations in a way meant to uphold or improve their motivation.

4.5 Data analysis

The aim of Sub-study I was to gain an overall understanding of first-year nursing students’ MR skills and to uncover nursing students’ MR profiles. The associations between the MR profiles and experienced study engagement, study burnout, and performance on students’ entrance examinations were studied. In addition, the study aimed to find out if there are differences in the MR profiles of students studying in BL and in traditional learning environments.

Data in Sub-study I were quantitatively analyzed using IBM Statistical Package for Social Sciences (SPSS) for Windows version 22® (2013). The analysis began by confirming the normality of the variables. To explore the factorial structure of the variables of MR, study engagement, and study burnout, a series of EFA using maximum likelihood extraction and both varimax and direct oblimin
rotations were conducted. By using factor analysis, the large dataset, which included several variables of items from questionnaire, was able to be reduced into fewer groups of variables and into descriptive categories (Yong & Pearce, 2013). The maximum likelihood was used because it has many advantages in that it makes it possible to compute of a wide range of indexes of the goodness of fit of model along with a wide array of estimates (Fabrigar, Wegener, MacCallum & Strahan, 1999). The factors were rotated with varimax and direct oblimin rotations for better interpretation, attaining an optimal simple structure and keeping each variable load on as few factors as possible while maximizing the number of high loads on each variable (Hair et al., 2019).

K-means clustering was used to divide a large set of observations into a number of clusters with the intention of finding out which group certain observations belong to (Kaufman & Rousseeuw, 2009). A series of K-means cluster analyses were conducted and evaluated to determine nursing students’ MR profiles. In this sub-study, two- and three-cluster solutions were tested.

To test the differences between clusters for MR, study engagement, and study burnout and whether there was a difference in students’ MR, study engagement, study burnout, and entrance examination scores when studying in different learning environments, independent-sample t-tests and corresponding nonparametric tests were conducted.

Sub-study II explored the MR profiles, study engagement, burnout, and academic performance of students in their second year of nursing studies. A longitudinal, person-oriented approach was used in order to follow the progress of and changes in the students’ MR profiles over the two years. The study focused on variations in nursing students’ MR, study burnout, and study engagement from the first to second year of their studies. In addition, the differences between MR profiles’ study engagement, study burn out and academic performance were investigated and compared between learning environment groups (traditional and BL).

In Sub-study II, both cross-sectional and longitudinal approaches were used to obtain survey data from the sample of nursing students. The data were analyzed using SPSS version 24® (2016). First, the normality of the variables was checked. As in Sub-study I, to examine the underlying structure of the variables of MR, study engagement, and study burnout, an EFA with maximum likelihood extraction was conducted. A K-means analysis was conducted to set MR profile clusters and to resolve their number. Independent t-tests were run to compare clusters and groups.
and repeated measures t-tests were conducted to explore the differences between the first year and second year values.

Linear regression analysis allows for the exploration of variation in one variable through one or several predictor variables (de Vaus, 2014; Metsämuuronen, 2017). In this sub-study, linear regression analysis was used to examine the relationships between students’ MR subscale scores and their GPA, and between students’ entrance examination scores and their GPA.

The qualitative data in Sub-study III consisted of interviews of nursing students. After the interview, the researcher transcribed the recorded interviews and de-identified the participants in the written transcript. To get familiar with the data, the researcher carefully read and re-read the transcribed interview texts.

In order to analyze the information and gain insight into the use of MR strategies, the textual data were qualitatively content analyzed with a deductive approach (Vaismoradi, Turunen & Bondas, 2013). The analysis involved rough data categorization, coding, re-categorization, recognition of frequencies, interpretation of the results, and the drawing of conclusions (Elo & Kyngäs, 2008).

The five sequential phases of the analysis procedure are summarized in Figure 6 and in the following paragraphs. A more detailed description of the analysis is provided in the original Article III.
In the first phase of the analysis, to tap into the notion of MR, all experiences that could be associated with MR theory (Wolters, 1998, 2003a) were selected. In the second analysis phase, to track appropriate MR, all episodes that positively described enhancing or maintaining students’ MR during their study path were selected. In the third phase, the particular MR strategies that students described using were identified. The criteria, codes, and coding protocol for the motivation strategy categorization were created based on MR strategies found in prior research (Wolters, 1998, 2003a; Wolters & Benzon, 2013).

The fourth phase of the analysis included analyzing the established codes more explicitly to discover the pragmatic individual or situational factors related to MR strategy use. Individual factors, such as a student’s self-imposed beliefs or actions, had to originate with the individual. Situational factors were related to external matters, such as learning environment arrangements, teaching methods, outside rewards, or other people. In the fifth analysis phase, the aim was to examine the
dynamics of how the MR strategies students described performed in the beginning, middle, and end of their studies.

Finally, in the sixth phase, conclusions were made about the uncovered MR strategies and their contributing factors and about the variability of MR strategy use throughout the study path. The conclusions were synthesized by connecting them to the established research questions.

4.6 Methodological evaluation and limitations

This dissertation study formed a continuum in which a longitudinal approach and complementary sub-studies supplemented each other. Longitudinal research is said to be methodologically demanding because it requires a lot of time and suitable infrastructure that can easily withstand the duration of the research period (Menard, 2002). In this study, data collection continued for three years. The data was collected from students who represented a sample of Finnish nursing students. The samples were selected from one Finnish UAS and nursing student groups who commenced their education at the same time. This ensured that the nursing students were consistently studying the same curriculum and that they enjoyed the same university’s infrastructure during the research period. However, it is a limitation that the sample was so homogeneous, representing only Finnish students from one UAS in northern Finland.

In a longitudinal study, data can be collected either from a large or small number of individuals (Menard, 2002). Obtaining representative and current data is a methodological challenge that is inherent to longitudinal surveys (Menard, 2002). A longitudinal survey collects data into the future from the same observational units, and one problem with this is that the same respondents may not be available the entire time (Menard, 2002). In this study, the sample size was not big and remained relatively stable and consistent. This study fulfilled the requirement that at a minimum, the data in longitudinal research has to be collected on each variable in at least two periods; this study also abided by the notion that quantitative and qualitative data can supplement each other (Neale, 2012). In this study, the findings derived from each type of data confirmed the results of the other and provided similar conclusions, giving greater credibility to the results (Fetters, Curry & Creswell, 2013). However, a longer follow-up time and more measurement intervals would have strengthened the reliability of the results.

Regarding methodology, it has been claimed that self-regulative motivational processes are best studied using triangulation and multiple methods, including
participants’ self-reporting (Karabenick & Zusho, 2015; Renninger, Cai, Lewis, Adams & Ernst, 2011). Accordingly, this study responds to the need to employ multiple methods and sources and consider context to capture the dynamic nature of SRL processes (Karabenick & Zusho, 2015). This study included self-reporting, and to ensure the validity and legitimacy of the self-reported responses, scrutiny of the self-reporting processes was important (Karabenick & Zusho, 2015). The data were collected with the same self-reported questionnaire in the first and second years of nursing studies. The third sub-study collected interview data in the third year of nursing studies. However, the self-reported measures required students to retrospectively report on their learning experiences, and the validity of them relied mainly on the accuracy of the participants’ retrieval processes (Karabenick & Zusho, 2015). To ensure that the data provided timely and memorable information, the assessment took place each year of the program and at the same time in the semester every year. To confirm that the sample remained representative, the surveys were conducted by the researcher primarily at the beginning of f2f classroom lessons. The online survey was complementary and provided only a few more completed questionnaire answers. The participation rate of both quantitative studies was relatively high. In Sub-study III, the sample for the interviews was purposefully selected to represent all four MR profiles identified in Sub-study II.

The main strength of the survey studies was that they utilized previously validated instruments (self-reported questionnaires) to analyze nursing students’ MR, study engagement, and study burnout (Maslach et al., 2001; Salmela-Aro et al., 2009; Salmela-Aro & Näätänen, 2005; Schaufeli et al., 2002; Schaufeli et al., 2006; Wolters & Benzon, 2013; Wolters & Won, 2018). This increased the validity of the questionnaires and made them easily adaptable to this study’s context and purpose of assessing the many core facets of MR, which were not otherwise easily observable during the longitudinal study (Wolters & Won, 2018). Cronbach’s alpha ranged from $\alpha = .72$ to $\alpha = .91$ for all the MR sub-scales (see Sub-studies I and II), from $\alpha = .83$ to $\alpha = .88$ for the both study burnout sub-scales (see Sub-studies I and II), and from $\alpha = .90$ to $\alpha = .92$ for the study engagement scale (see Sub-studies I, II and III), suggesting, along with the results of EFAs, that the instruments were valid and reliable measures for the research.

In the third sub-study (see Sub-study III), the qualitative interview allowed the nursing students to reflect on their entire study path and to use their own voice to discuss learning experiences related to motivation. More specifically, one strength of using an interview to assess self-regulation of motivation was that participants could freely provide a wide range of responses (Wolters et al., 2011). Participants
were not limited to predetermined categories or cues provided directly by the instrument. Thus, interviews could lead to the revelation of new motivational strategies that the researcher had not considered earlier (Järvenoja & Järvelä, 2005; Wolters et al., 2011).

Before the interviews, the researcher conducted two pilot interviews to test the validity of the instrument. To ensure trustworthiness, the authenticity of the interview atmosphere was a priority. The participants were interviewed in authentic learning environments on campus or at their practical placements in clinics. This contributed to an interview atmosphere that was approachable, relevant, and familiar to the participants. All of the interviews were conducted by the same researcher, the corresponding researcher. The sample was purposefully selected to represent all four MR profiles identified earlier in Sub-study II. In qualitative research, purposeful sampling is advantageous because bias is reduced as the sample is refined to meet the study aims (Noble & Smith, 2015).

In order to capture memories from students’ entire study path, the qualitative methods in Sub-study III included methodological triangulation (within method) (Fusch, Fusch & Ness, 2018; Patton, 2002): Semi-structured interviews were combined with stimulated recall, retrospective visualizations, and students’ descriptions of those visualizations. These methods were also meant to increase consistency and diminish misinterpretations of the interview data. In this study, the importance of both individual and situational factors, particularly in the BL context, was foregrounded, and the visualization based on the three-year study path helped to make contextual variables more visible and easier to talk about. The situational aspects were regarded as important since contextual characteristics and events form circumstances that may lead to success (or failure) in regulating learning and motivation (Kaplan, 2008; Karabenick & Zusho, 2015; Pintrich, 2000a; Zimmermann, 2000). In addition, when studying motivational issues that may include multifaceted and emotional factors, an interview is considered a favorable research method. Methodological triangulation through the use of visually stimulated recall along with an interview was found to be necessary to capture the rigorous, person-specific, and contextual variables that coalesce to determine how students describe their experiences of motivation during their education. Although this study included three measurement points, multiple methods, and triangulation in order to achieve a high degree of generality in its findings, comparable future studies should be done in more than one context and with a bigger and more heterogeneous sample at all measurement points. (Karabenick & Zusho, 2015).
In the analysis phase, each interview was read over many times to ensure the credibility of the data. To ensure the reliability of the analysis process, the transcript, analysis phases, and coding protocol were all reviewed and discussed many times by all of the researchers. I, as the lead researcher, was primarily responsible for the analysis process and continued to work with the data until a consensus regarding the analysis, the main codes, and the categories was reached. In qualitative research, reliability relates primarily to the reliability of the agreed upon codes used to analyze passages of text (Creswell & Plano Clark, 2007, pp. 134–135). Intercoder reliability was measured in Sub-study III to verify the reliability of the analysis coding protocol. Two external researchers were asked to analyze 23% of the interview data. Interrater reliability was measured with Fleiss’s kappa, and it indicated almost ideal reliability (0.85) (Landis & Koch, 1977).

To gain a comprehensive understanding of the data and to increase the reliability of the results, frequencies were utilized to detect significant trends in the content analysis (Vaismoradi et al., 2013). This quantification clarified the processing of the qualitative data and helped the researcher obtain a more comprehensive general view of frequently used MR strategies (Onwuegbuzie & Johnson, 2006). However, the frequency of an issue could be an indication of either its importance or the students’ willingness to discuss it.

The dissertation consists of three research articles (see Articles I–III), all of which were published in international peer-reviewed scientific journals between 2018 and 2020. Each sub-study was carried out according to the acknowledged instructional research principles and rigorously described in the original journal articles. In addition, completion of the COREQ (Consolidated Criteria for Reporting Qualitative Research), a 32-item checklist for qualitative studies, was required by the publisher of the third article (Tong, Sainsbury & Craig, 2007). All of the requirements in the three domains of research team and reflexivity, study design, and data analysis and reporting were followed. Due to their longitudinal design, the research articles form a solid and progressive unit and enable observers to follow the whole study process and reasoning behind this dissertation.

It is a limitation that this study investigated the SRL process narrowly from a MR point of view and within this study’s specific context of study well-being and performance in undergraduate nursing education in Finland. Thus, it could not address other potentially significant aspects of the phenomenon (e.g., metacognition in SRL).

One strength of the results is that the implementation of nurse education in Finland is based on the general standards of EU’s training requirements for general
care nurses and obeys the same strict contracts as other EU countries (Directive 2005/36/EC; Directive 2013/55/EU). Yet, to gain more generalized and transferable results, future research should be conducted with larger and more heterogeneous samples, at multiple universities and within different professional fields. In addition, it would have been beneficial to continue with student follow ups through their transition to working life to see how they master skills and cope with problems at work and then compare the findings to their earlier MR profiles. Despite these limitations, the results of this study improve our understanding of the impact of motivational regulation on students’ study well-being, at least in undergraduate nurse education programs and other healthcare education programs (e.g., programs for midwives and paramedics). Furthermore, the results could inspire new research topics in this area.

### 4.7 Ethical considerations

As a researcher you are concerned with research ethics that refers to principles, values, and practices concerning the data collection, analysis, and dissemination of the research findings (Jordan, 2013; Steneck, 2006). This means for example protecting participants rights, using validated methods, obtaining reliable data, and making rational conclusions of the results (Jordan, 2013; Steneck, 2006). In this study all sub-studies followed proper ethical procedures and the guidelines of the Finnish Advisory Board on Research Integrity (TENK, 2012, 2019). The measures and data processing used in this study met TENK’s ethical principles for research with human participants and support the application of the European Union’s General Data Protection Regulation (GDPR) (EU, 2016).

The research adhered carefully to principles (integrity, meticulousness, accuracy) endorsed for the Finnish research communities (TENK, 2012). To confirm the scientific criteria and ethically sustainable methods in data acquisition the research permission was acquired from the university’s director of education, research, development, and innovation in healthcare and nursing education and from the participants. The participants were informed about the content of the study, data processing and their rights, including the permission to collect data, record the interviews, voluntary participation, and their right to withdraw from the study. They were told about the researcher’s commitment to ensure anonymity and confidentiality. They were notified that any decision concerning their participation would have no effect on their studies or grades and that participants were allowed to contact the researcher regarding any matters concerning the study. The research
data has been saved safely in a locker and electronically in a password-protected format. Only the lead researcher had access to the collected data. The data will be destroyed after the research is complete.

In the beginning to comply the scientific standards in planning, conducting, and reporting the research, all the researchers agreed on their roles, rights, and responsibilities in this research project (TENK, 2012). Throughout all the sub-studies and article writing, the lead researcher was primarily responsible for the work. However, all the researchers worked as a group in all of the sub-studies. For mixed-method studies, Creswell and Plano Clark (2018) recommend working in research groups to allow for the combination of multidisciplinary skills. Although the lead researcher understood both qualitative and quantitative data collection and analysis, working collaboratively was recommended so that different kinds of expertise could be utilized and methodological know-how could be supplemented (Creswell & Plano Clark, 2018). The work and achievements of other researchers’ have been respected by citing their publications appropriately (TENK, 2012).

The financial sources and conflicts of interest are reported in each article (TENK, 2012). The lead researcher was working as a senior lecturer and study counsellor in the university’s nursing education department. Thus, there may be pros and cons of this double-role to consider when evaluating the trustworthiness of this study. As a researcher, it is clear that the subjectivity of the researchers remained and that the researchers brought to each study their experiences and ideas (Fusch et al., 2018; Noble & Smith 2015). From the researchers’ point of view, their social proximity to the target group was not too close, though as a researcher I was well acquainted with the target and study object (e.g., learning environment, culture, and context). That helped me to conduct the study proficiently in each phase. The research purpose was primarily societal and educational: To gain an understanding of nursing students’ MR and study well-being; however, due to my profession, it was also partly personal.
5 Overview of the articles

This dissertation consists of three empirical articles (see Articles I–III). The first two articles focused on longitudinally examining first and second year nursing students’ MR and MR profiles and their association with study engagement, study burnout, and academic performance (see Articles I and II) both in traditional and BL environments. Article III focused on nursing students’ successful MR strategies and their contributing factors during a three-year BL program. The author of this dissertation was the lead author of each article and responsible for empirical data collection, data analysis, theoretical grounding, and interpretation of the results and implications. The focus of each article and the author’s contributions are summarized in Table 3.

Table 3. Focus of the articles and the author’s role.

<table>
<thead>
<tr>
<th>Article</th>
<th>Focus</th>
<th>Author’s participation</th>
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<tbody>
<tr>
<td>I</td>
<td>First-year nursing students’ MR and MR profiles and their connection to study engagement, study burnout, and academic performance in BL and traditional learning environments</td>
<td>lead author, empirical data collection, data analysis, theoretical grounding, interpretation of results and implications</td>
</tr>
<tr>
<td>II</td>
<td>Second-year nursing students’ MR profiles’ progress and connection to study engagement, study burnout, and academic performance in BL and traditional learning environments</td>
<td>lead author, empirical data collection, data analysis, theoretical grounding, interpretation of results and implications</td>
</tr>
<tr>
<td>III</td>
<td>MR strategy use during nursing studies in a blended learning environment</td>
<td>lead author, empirical data collection, data analysis, theoretical grounding, interpretation of results and implications</td>
</tr>
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5.1 Sub-study I: Nursing students’ motivation regulation and its relationship with study engagement and study burnout

The purpose of this first quantitative sub-study, reported in Article I, was to explore first-year undergraduate nursing students’ \((N = 90)\) MR and its relationship to study engagement and study burnout in blended and traditional learning environments. The study utilized questionnaire data, including data obtained using the MR scale (Wolters & Benzon, 2013), study engagement scale (Schaufeli, et al., 2006), and study burnout scale (Maslach et al., 2001, Salmela-Aro et al., 2009, Salmela-Aro & Näätänen, 2005) and data from the university’s administrative register (entrance examination scores). The specific focus of the study was identifying the MR
profiles of first-year nursing students and investigating how study engagement, study burnout, and learning environment relate to them.

The results of this study revealed that regardless of the learning environment, the majority of first-year nursing students (65.6%) had a high-level MR profile, while approximately one-third (34.4%) displayed a less-developed MR profile. Students with a high-level MR profile demonstrated high-level MR on all measured MR scales, including those measuring regulation of mastery and performance goals, self-consequating, environmental structuring, and regulation of value. In addition, they demonstrated strong study engagement and less susceptibility to study burnout, particularly with regard to cynicism, than those with less-developed MR profiles.

Overall, this study contributed to the understanding that strong MR skills are likely to strengthen nursing students’ study engagement. The findings suggest that stronger MR skills reduce students’ risk of study burnout by enhancing learning and by providing a means for coping with study-related challenges. Furthermore, this indicates that increased study engagement and a reduced risk of developing study burnout encourages students’ endeavors in studying and further improves their development of advanced learning skills.

5.2 Sub-study II: Progress of nursing students’ motivation regulation profiles and affiliations with engagement, burnout, and academic performance

This study (see Article II) investigated nursing students’ MR and the progress of undergraduate nursing students’ MR profiles from their first year to second year ($N = 98$). The study was longitudinal and focused on exploring the same student participants’ ($n = 69$) MR progress over two years of studies in traditional and BL environments. In addition, the relationship between the profiles and students’ study engagement, study burnout, and academic performance was explored. The data consisted of the students’ responses to the same questionnaire at two different intervals, one in the middle of their first year and the other in the middle of their second year. The questionnaire consisted of MR (Wolters & Benzon, 2013), study engagement (Schaufeli et al., 2006), and burnout scales (Maslach et al., 2001, Salmela-Aro, et al., 2009, Salmela-Aro & Näätänen, 2005). Students’ entrance examination scores, completed credits, and GPAs were obtained from the university’s administrative register.

The results indicated that, overall, a majority of the second-year students ($n = 98$) performed at high or at least moderate levels in MR and study engagement. The
analysis indicated that, overall, regarding study burnout, students experienced a moderate level of exhaustion but a low level of cynicism. The entrance examination scores and self-consequating (a variable from the MR scale) had a positive relationship with GPA.

The longitudinal results showed that a majority (62.3%) of the second-year nursing students showed highly developed MR profile over time. Slightly over one-third (37.7%) represented less-developed MR profile. Students with high MR profile showed strong study engagement, had a higher academic performance (GPA) and reduced vulnerability to cynicism. No significant differences, in any results, were detected regarding to their learning environment.

A person-oriented analysis revealed individual transitions between MR profiles over time: Some students moved from a high-level MR profile to less-developed profile or vice versa. Moving from a less-developed MR profile to a high-level MR profile was more typical. Approximately one-third (34.8%) shifted from a less-developed MR profile to a high-level MR profile, and one-quarter shifted (23.9%) the other way.

The findings of this study suggest that appropriate use of motivational strategies contributes to higher levels of commitment, achievement, and study well-being (in terms of study engagement and cynicism). In addition, the results indicate that the essence of individual MR is changeable. It is assumed that either situational or individual factors have an influence on MR levels during studies. To reach a more explicit understanding of this emerging phenomenon, further research should apply a qualitative design and focus on situations and factors influencing students’ MR during their studies.

5.3 Sub-study III: Nursing students’ motivation regulation strategies in blended learning: A qualitative study

This study, reported in Article III, focused on gaining a deeper understanding of the MR strategies nursing students’ use throughout their study path in BL program. Furthermore, the study examined the contributing factors to the appropriate MR strategies that students applied. The qualitative study used purposeful sampling. Undergraduate nursing students (n = 12) who represented different MR profiles and had three years of experience studying in a BL degree program were interviewed retrospectively. To gain a deeper understanding of the use of MR strategies and the factors supporting students’ MR throughout their three-year study path, the textual data was deductively content analyzed.
The content analysis uncovered seven of the most typically used motivation strategies in nursing studies. The unveiled MR strategies were environmental structuring, self-consequating, goal-oriented self-talk, efficacy management, emotion regulation, regulation of value, and interest enhancement. Students’ individual thoughts and behaviors and situational and environmental factors enhanced and helped maintain the appropriate use of MR strategies. The students’ use of MR strategies was versatile and varied according to the study phase (beginning, middle, or end).

Overall, Sub-study III increased the understanding of nursing students’ MR strategy use. The findings identified the seven most commonly used strategies and the situational and individual factors contributing to the use of these strategies. The study uncovered many of the various ways students applied MR strategies throughout their studies in a BL environment.
6 Main findings

This dissertation focused on MR and its relation to study well-being as they manifest in a nurse education context. This chapter describes the main findings in relation to the posed study aims and earlier research. The first aim of this research was to investigate the characteristics of nursing students’ MR during nursing studies. The second aim was to study the relationship between nursing students’ MR, study well-being, and performance. The third aim was to explore the enhancement of MR and MR strategy use in connection to nursing students’ learning environments. More detailed findings can be found in the original articles (see Articles I–III).

6.1 Versatility of motivation regulation

Nursing students’ MR is versatile and adaptable individually, temporally, and situationally during nursing studies.

In line with earlier research (Engelschalk et al., 2017; Ketonen, 2017; Schwinger & Steinsmeier-Pelster, 2012; Smit et al., 2017; Wolters & Benzon, 2013) the findings of this dissertation (see Articles I and II) indicate that nursing students can undergo transition between different levels of MR throughout their studies. There occurs either an improvement or decline in the utilization of MR over time. These findings support the ideas that MR is not a stable skill and that students are not a homogeneous group in terms of MR.

The findings of this dissertation study revealed that certain types of profiles can be identified, representing a range of MR levels. Regardless of the learning environment, nursing students displayed two different kinds of MR profiles: High-level MR and less-developed MR. Students with a high MR profile displayed continuously high levels in all measured MR categories, including regulation of performance, regulation of mastery goals, self-consequating, environmental structuring, and regulation of value.

In addition, nursing students with different motivation profiles appeared to follow four different MR progression paths (see Article II) over the course of their studies. There were two stable profiles representing students who consistently demonstrated either high or less-developed MR over time. However, there were also two profiles representing students who shifted either from the high-level MR profile to less-developed profile or vice versa. The shift from the less-developed
MR profile to the higher-level motivation profile was more common over time. Approximately one-third of less-developed MR profile holders shifted to high level MR profile and one-quarter of the high-level MR profile holders shifted to less-developed MR profile over time.

The fact that the nursing students already differed in their MR profiles at the beginning of their studies suggests that pre-existing study-related beliefs or personal study history might have influenced their current MR profiles (Schunk, 2009). This also implies that students may face difficulties in MR from the very beginning of their studies and continuously throughout their studies.

This dissertation research revealed that certain strategies—regulation of mastery goals, regulation of performance goals, self-consequating, environmental structuring, and the regulation of value—were weaker in the less-developed MR profile (see Articles I and II). This leads to consideration of whether the promotion of certain MR strategies should be emphasized when scaffolding learning in nurse education. According to earlier research, self-regulation is a proactive process in which a teacher has to be proficient at SRL to be able to embed self-regulative processes in teaching in order to help students to recognize, monitor, and develop their own self-regulative skills (Kramarski & Kohen, 2017; Pintrich, 2002; Zimmerman, 2008). This raises a further question: What kind of educational implementations would support both teachers and students in recognizing, reflecting, and modifying the diverse and variable requirements of appropriate MR?

Moreover, the findings (see Article III) indicated that nursing students could be placed into three groups based on when they used MR strategies in their nursing studies, whether it was at the beginning, middle, or end. The students in the “beginning” group applied MR strategies most often at the beginning of their nursing studies. They used several MR strategies simultaneously, but environmental structuring and emotion regulation were the most prominent. The students in the “middle” group used MR strategies most often in the middle of the program. The MR strategies they typically used were regulation of value, efficacy management, and goal-oriented self-talk. The students in the “end” group were most likely to apply MR strategies at the end of their studies. They utilized strategies such as environmental structuring, self-consequating, and the regulation of value.

The findings of all of the sub-studies (see Articles I–III) confirm earlier findings that students hold different individual motivational approaches and have to modify their use of MR strategies to fit the situational challenges and circumstances they encounter over the course of their studies (Järvenoja et al., 2015;
The results indicated that many different MR strategies were used throughout the program, confirming previous studies that demonstrated the heterogeneity of MR (Wolter & Benzon, 2013). The results strengthened the assumption that the choice of strategies, the time of their implementation, and the extent they are used varies (Engelschalk et al., 2017; Järvenoja et al., 2015). The results demonstrated that students implement motivational strategies differently (e.g., effectively, or ineffectively) in challenging situations and in different phases of their studies (Barnard-Brak, Paton & Lan, 2010; Engelschalk et al., 2017). The diversity of MR strategy use in this study makes clear that similar support for every student does not fit each student in a given program. Also, it can be difficult for a student to find and execute the most effective MR strategy in every situation. The accurate selection of an MR strategy requires students to recognize the nature of the requirement or challenge. This dissertation confirms the findings of earlier research that educators would benefit from understanding the differences between applied MR strategies; this could help them to adjust, optimize, and personalize support for students and sustain students’ MR throughout their study path (Broadbent, 2017; Dörrenbächer & Perels, 2016; Dziuban et al., 2018; Vanslambrouck et al., 2019).

6.2 Motivation regulations’ relationship with study well-being and performance

MR is related to study well-being and performance in undergraduate nurse education.

The longitudinal findings of this dissertation study (see Articles I and II) revealed that MR was associated with students’ performance and permanently with study well-being. MR was related to nursing students’ studying in three different ways during the first two years of studies. Remarkably, the level of MR was associated with the crucial dimensions of study well-being. First, higher, or lower levels of MR was associated with a reduced or increased risk of study burnout, respectively. Moreover, a higher or lower level of MR was associated with a higher or lower level of study engagement. Third, a higher or lower level of MR was associated with a higher or lower level of academic performance.

Although the findings indicated that, overall, the nursing students were highly engaged in their studies and experienced low levels of exhaustion and cynicism in the first year of their studies (see Article I) further analysis of MR profiles showed
that MR profiles differed significantly in terms of their relationship to both aspects of study well-being: Study engagement and study burnout (see Articles I and II). Nursing students with a high-level MR profile demonstrated significantly higher study engagement than students with a less-developed MR profile in both the first and second year of studies. Similarly, students with a high-level MR profile suffered fewer burnout symptoms and experienced less cynicism than students with a less-developed MR profile in both years. Furthermore, students with a high-level MR profile had a higher GPA than students with a less-developed MR profile (see Article II). In addition, second-year nursing students’ overall study engagement decreased compared to the first year of studies. Second-year students also displayed only a moderate level of study engagement, and overall study burnout levels also increased compared to the first year of studies. These findings are not surprising, as prior research has shown an association between the appropriate use of MR strategies and higher levels of performance and an association between weaker MR strategy use and decreased well-being (Boekaerts, 2011; Grunshel et. al, 2016; Schwinger et al., 2012; Smit et al., 2017).

Presumably, the relationship between the features of MR and study well-being is complicated and mutual; when one or another of the features changes (improves or weakens), it influences the others (Gross, 2015; Schwinger & Stiensmeier-Pelster, 2012). Prior studies have stated that the interrelatedness between MR, study engagement, and study burnout is likely to be bidirectional (Ketonen et. al, 2016; Salmela-Aro & Upadyaya, 2014). For example, when a student suffers from study burnout symptoms, the situation challenges her ability to regulate her motivation appropriately or to fully engage in studies. Conversely, when, for example, a student feels energetic and engaged, his MR is successful, and he does not suffer from any burnout symptoms. It is not possible to say what might have directly caused the study burnout symptoms because the symptoms can stem from multiple factors, such as a heavy study workload or stressful personal issues. Based on the finding on the versatility and adaptability of nursing students’ MR, it can be assumed that even small changes and interventions in educational practice can have large effects—in other words, for some students, an accumulation of small factors can determine their success and ability to cope with their studies.

The findings of this dissertation showed that nursing students with a higher-level MR profile can still be susceptible to feelings of study-related exhaustion (see Article II). This finding is in line with earlier studies indicating that highly engaged and motivated students can simultaneously express strong feelings of study-related exhaustion (Salmela-Aro & Read, 2017; Tuominen-Soini & Salmela-Aro, 2014).
Therefore, it is recommended that educators maintain support for students even when they display a relatively high level of MR and study engagement, particularly in nursing studies where exhaustion can lead to attrition, lower academic and occupational preparedness, and lower levels of mastery in future clinical performance (Pitt et al., 2012; Rudman & Gustavsson, 2012).

Differing from earlier studies (Schwinger et al., 2012; Smit et al., 2017), of the MR variables, a high level of self-consequating predicted better academic performance in this dissertation study (see Article II). Looking more closely, this may be because a self-consequating strategy includes factors related to self-efficacy, which in turn has been found to positively influence students’ performance and well-being (Gibbons et al., 2011; Priesack & Alcock, 2015; Sarikoc, 2017; Trautner & Schwinger, 2020). Enhancing self-efficacy may encourage nursing students’ adaption to different learning environments and cognitive learning processes, such as the comprehension of new concepts (Kuiper et al., 2010; McComb & Kirkpatrick, 2016). This confirms earlier research that suggested it is advisable to establish strategies such as self-efficacy and persistent self-talk to convince students of their capabilities and encourage their perseverance in completing coursework (Sarikoc, 2017; Wolters & Benzon, 2013).

In conclusion, even though the students demonstrated good or moderate MR levels collectively, it was revealed that there were significant differences between students’ MR profiles and their study well-being. This tendency was enduring and became apparent repeatedly in longitudinal measurements. Even the moderate level of MR was associated with lower study well-being. These findings support the findings of earlier studies that motivational support may help nursing students to flourish both during their studies and in their transition to nursing practice (Bartlett et al., 2016; Bronson, 2016; Flinkman & Salanterä, 2015; Kailanen, 2020; Khalaila, 2015; Nesje, 2015). Conversely, a teaching or learning environment without a focus on the enhancement of students’ MR skills can leave students vulnerable to overloading, trouble engaging in studies, or a failure to meet the academic and practical demands of their studies.

6.3 Motivation regulation and learning environment

_Nursing students’ MR and MR strategy use can be enhanced individually and situationally regardless of the learning environment._
The findings of Articles I and II indicated that regardless of the learning environment, there were no significant differences in MR, study well-being, or academic performance between students in BL program and students in traditional learning program.

Nursing students’ MR and its relation to study well-being and performance were explored in the first and second years of nursing studies in two learning environments, blended and traditional, and the results were compared to each other (see Articles I and II). Due to the finding that there were no differences between the learning environments, it was assumed that MR can be enhanced equally in both learning environments. However, earlier research has shown that a BL environment can be challenging for nursing students (Jokinen & Mikkonen, 2013; Jowsey et al., 2020; McCutcheon et al., 2015; Milligan & Littlejohn, 2016; Smyth et al., 2012). Therefore, there was a desire to explore the use of MR strategies in a BL environment more deeply with qualitative methods (see Article III).

The findings were (see Articles I and II) in line with earlier studies that confirmed that learning and MR can be sustained in both traditional and BL environments (Chen, Stocker, Wang, Chung & Chen, 2009; Kumrow, 2007; Smyth et al., 2012). Consistent with the earlier research, the findings (see Article III) demonstrated that a digitally enhanced learning environment can be tailored to assist with MR by, for example, supporting students’ goal setting with the help of encouraging teaching methods (e.g., Hoops, Shirley, Wnag & Holyyer, 2016; Urdan & Schoenfelder, 2006).

The findings (see Article III) indicated that nursing students continuously experienced episodes that encouraged their use of several different MR strategies during their three-year education in a BL environment. Regardless of their identified MR profiles (high-level or less-developed), students were found to utilize seven appropriate MR strategies: Environmental structuring, self-consequating, goal-oriented self-talk, efficacy management, emotion regulation, regulation of value, and interest enhancement. The use of these seven strategies is in line with previous studies of pivotal MR strategies that students tend to use (Boekaerts, 2011; Wolters, 1998, 2003a; Wolters & Benzon, 2013).

The results showed (Article III) that the use of the uncovered MR strategies was enhanced and maintained by several individual factors that were related to students’ personal thoughts and behavior and by situational factors that were related to the learning situation, environment, social interaction, or pedagogy in a BL environment context. This confirms the findings of previous studies that contributing factors can derive from students’ individual thoughts, beliefs, and
actions, or they can stem from situational factors related to the learning environment or pedagogical policy (Engelschalk et al., 2017; Järvelä et al., 2016; Järvenoja et al., 2015).

For example, high-quality BL arrangements, an engaging curriculum, an adequate workload, and timely supervision were found to be supportive factors in environmental structuring. Students benefited from interactive online and face-to-face teaching methods, an exploratory learning method, applied learning tasks, a supportive atmosphere, and constructive feedback from teachers and mentors in their working lives. Help-seeking and supportive talk from teachers and peers also contributed significantly to students’ MR in environmental structuring. These findings confirmed the findings of earlier studies that environmental structuring is positively associated with situational practices, teaching, support, and feedback, which provide students with an added willingness to arrange online study environments for more optimal studying (Du, 2016; Xu, et al., 2013, 2015). The regulation of learning environments can consistently be affected by an individual’s efforts to control the learning setting (e.g., the materials, tasks, and level of help-seeking) or by others or other situational factors (e.g., peer support, feedback, and the curriculum) (Du, 2016; Pintrich, 2004).

Individual self-reinforcement behaviors, such as self-administered consequences for negative behaviors, enhanced students’ self-consequating strategy use. Students benefited from self-discipline, perseverance, verbal self-praise, and self-efficacy talk about, for example, their capability to exercise control over events that affect their lives (see Article III). Furthermore, thinking about avoiding punishment or, to the contrary, thinking about rewards for oneself was found useful. These findings are in line with earlier studies in which high levels of perseverance and self-efficacy in SRL were shown to increase the likelihood of students making an effort to strategically regulate motivation or forcing themselves to continue when faced with motivational obstacles (Kim, Brady & Wolters, 2018). Notably, self-efficacy talk has been associated positively with students’ engagement and study well-being and performance and negatively with burnout (Gibbons et al., 2011; Kuiper et al., 2010; McComb & Kirkpatrick, 2016; Priesack & Alcock, 2015; Salmela-Aro & Upadyaya, 2014).

Students’ emotion regulation was enhanced individually by building on and sustaining positive and enthusiastic attitudes towards studies in challenging situations (see Article III). Situationally, belonging to study group, peer support and particularly encouragement from peers in permanent study groups, was an essential factor in strengthening students’ emotion regulation. An adequate workload,
purposeful tasks, student-centered, interactive, and supportive teaching methods were found to contribute to emotion regulation. Moreover, personal success in studies, a well-organized online learning environment, and a pleasant personal-life situation (in terms of family, hobbies, finances, etc.) were found to influence emotion regulation positively. In earlier studies it has been found that situations in which students find engaged learning challenging are more open to emotion regulation than non-challenging situations (Ben-Eliyahu & Linnenbrink-Garcia, 2013; Järvenoja et al., 2019, 2020). However, students may regulate their emotions at any point in the emotion generation process, and regulative strategies may be either preventive or remedial (Boekaerts, 2011). Students may, for example, embrace certain situations and try to avoid others in order to avoid emotional arousal. They may also reduce emotional arousal at the time an emotion occurs by using emotion suppression (e.g., forcing oneself to stay calm), changing the situation (e.g., going somewhere else), or diminishing the negative effect of the emotion by asking for social support beforehand or refusing unwanted advice and evaluative feedback (Boekaerts, 2011).

Efficacy management originates primarily from an individual’s ability to monitor, evaluate, and purposefully control expectations and perceptions of competence for successful, effective learning and assignment completion (see Article III). The development of personal learning skills is crucial to better efficacy management. Of the situational factors, an engaging curriculum and timely supervision were found to facilitate efficacy management. In line with earlier studies, nursing students improved their efficacy management by setting proximal goals and managing time effectively (Schwinger et. al., 2012; Schwinger & Stiensmeier-Pelster, 2012).

Goal-oriented self-talk sustained students’ desire to achieve performance or mastery goals (see Article III). Goal-oriented self-talk about performance goals was typically related to situational stimulants: High grades, good assessments, successful performance, on-time graduation, earning credits, or obtaining employment and financial benefits. In line with this study, it has been demonstrated that reminding oneself about the importance of good grades is highly rated strategy, followed closely by reminding oneself of the real-world usefulness of learning about a topic (Sansone et al., 2012).

Mastery goals were driven by an individual’s desire to set and achieve personal learning goals, find the learning process meaningful, and become more competent and knowledgeable as a nurse. As in earlier research, the regulation of mastery goals reflected students’ beliefs about their effort to make learning, understanding,
and improving their competence more salient; the regulation of performance goals, in turn, reflected the personal importance of doing well and getting good grades (Kuiper et al., 2010; McComb & Kirkpatrick, 2016; Schwinger & Streinsmeier-Pelster, 2012; Song et al., 2016; Wolters & Benzon, 2013; Zusho, Pintrich & Cortina, 2005).

In line with earlier studies, mastery goal orientation has been shown to be a strong predictor of student success and study engagement in online learning environments (Fanguy, Costley, Lange, Baldwin & Han, 2018). Students who have higher levels of mastery goal orientation are more likely to engage in lecture behaviors such as splitting their attention between media sources, pausing a video lecture, and re-watching parts of a video lecture.

Individual thoughts that enhanced students’ professional competence empowered their regulation of value (see Article III). Students thought about the utility and relevance of their studies to working life. They expressed that studying and learning increased their competence, deepened their understanding, and provided them with beneficial, practical career skills. In earlier studies, valuing has had a positive relationship to the value students ascribe to schoolwork and their intention to use MR strategies (O’Keefe & Linnenbrink-Garcia, 2014; Smit et al., 2017). This means that students who perceive studying as more valuable report greater use of other motivational strategies, resulting in them finding more pleasure in their coursework and making a greater effort in their coursework compared to students who attach less value to coursework.

The individual desire to graduate and become a nurse encouraged students’ use of interest enhancement strategy (see Article III). Moreover, subjects or domains that were found to be particularly interesting, logically challenging situations, engaging teaching, and study methods contributed to interest enhancement. Teachers’ supportive attitudes, feedback, and successfully completed practical training periods enhanced and maintained students’ levels of interest. Similarly, in earlier studies, interest in learning has been tied to specific content, topics, or actions in an educational context (O’Keefe, Dweck & Walton, 2018; Thoman, et al, 2019). Online learning environments have proven to be particularly sensitive to students’ self-regulatory trade-offs between maintaining interest and performance (Sansone et al., 2012). Similarly, in technology enhanced learning environments, educators have found it beneficial to provide support by triggering students’ situational interest through instruction and feedback that sustain students’ attentiveness, curiosity, innovativeness, problem solving, and question forming (Hidi & Renninger, 2006). Furthermore, offering integrated and meaningful tasks
involving choices, promoting versatile activities, and collaborative learning practices are seen as valuable in developing students’ interest in learning (Hidi & Renninger, 2006; Laine et al., 2017; Thoman et al., 2019). For instance, peer support among nursing students can make coursework more interesting and increase students’ perseverance when the coursework feels difficult (Xu et al., 2013).

To summarize, the findings revealed that nursing students actively utilized several crucial MR strategies during their studies in a BL environment. The strategies were enhanced by several individual and situational factors that should be paid attention to when making pedagogical and learning environmental choices.
7 Discussion

This chapter discusses the theoretical and practical implications of this dissertation. In addition, ideas for future research are considered.

The main findings are summarized here as follows: Nursing students’ MR is versatile and varies individually between students and over the course of studies. MR is related to study well-being and performance. Nursing students utilize several pivotal MR strategies, which can be enhanced by individual and situational factors in nurse education learning environments. Appropriate MR is associated with better study well-being and performance, and the identified MR strategies are considered beneficial to nursing studies. Summary of the main findings is presented in Table 4.

Table 4. Summary of the main findings.

<table>
<thead>
<tr>
<th>MR</th>
<th>Main findings</th>
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<tbody>
<tr>
<td>Versatility of MR</td>
<td>Two different MR profiles:</td>
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<tr>
<td></td>
<td>High-level MR profile and less-developed level MR profile.</td>
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<tr>
<td></td>
<td>Four different MR profile progression paths:</td>
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<td></td>
<td>Permanently high-level, permanently less-developed level, shift from high-level to less-developed level, and shift from less-developed level to high-level.</td>
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<tr>
<td></td>
<td>MR strategy use is versatile and varies individually over the course of a study path.</td>
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<tr>
<td>MR is related to study well-being and performance</td>
<td>High-level MR profile:</td>
</tr>
<tr>
<td></td>
<td>Higher study engagement and academic performance and less burnout (cynicism).</td>
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<tr>
<td></td>
<td>Less-developed MR profile:</td>
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<tr>
<td></td>
<td>Lower study engagement and academic performance, and higher study burnout (cynicism).</td>
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<tr>
<td>MR and learning environment</td>
<td>Nursing students’ MR can be enhanced regardless of the learning environment (traditional vs. BL environment).</td>
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<tr>
<td></td>
<td>Seven appropriate MR strategies:</td>
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<tr>
<td></td>
<td>Environmental structuring, self-consequating, emotion regulation, efficacy management, goal-oriented self-talk, regulation of value, and interest enhancement.</td>
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<tr>
<td></td>
<td>Each MR strategy can be enhanced by several individual and situational factors during nursing studies.</td>
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7.1 Theoretical implications

The main focus of this dissertation was to understand the motivational mechanisms and factors behind nursing students’ study well-being. It aimed to explore MR, its relation to study well-being and performance, and appropriate MR strategy use during studies. At a theoretical level, SRL theory, specifically Boekaerts’s (2011) dual processing model of SRL (see Sub-chapter 2.4, Figure 2), provides a feasible theoretical framework for discussion of the results as it simultaneously addresses MR from motivational, study well-being, mastering performance, and learning environmental angles, all of which were central to this study.

“Versatility of MR” refers to MR’s variability, adaptability, and vulnerability to individual changes. This finding is compatible with Boekaerts’s (2011) dual processing model’s notion of the different purposes that affect students’ WM, and, regarding appraisal and assessment processing, further influence which learning pathway is activated (growth or well-being). According to the dual processing model, different learning intentions, affects, and contextual factors influence this appraisal and assessment process. When a student’s focus is on motivational appraisals and assessments, this process refers primarily to MR and the use of relevant MR strategies. The type and intensity of MR strategies used varies individually, depending on students’ MR skills (either high-level or less-developed), current purposes and requirements of their study path. Moreover, other researchers have acknowledged the changeability of MR and that students’ motivational assessment is an essential part of MR (Miele & Scholer, 2018; Schwinger & Stiensmeier-Pelster, 2012; Wolters, 2003a).

The finding “MR is related to study well-being”—specifically, the finding that a lower level of MR is associated with a lower level of study well-being and vice versa for higher MR—supports the dual processing model’s (Boekaerts, 2011) notion of the two different goal pathways that the appraisal–assessment process activates while determining which pathway dominates (growth or well-being). Conversely, less-developed MR or a lack of support for MR can drive a student towards simply coping with poor study well-being and performance. If a student’s MR is not successful, it can lead the student to struggle with challenges related to study well-being, such as weakened study engagement and increased study burnout symptoms, and progress in this direction commits the student to the well-being pathway. On the other hand, the finding “MR is related to performance” confirms that more successful, higher-level MR propels a student’s learning towards
performance mastery, and thus commits the student to the growth pathway (Boekaerts, 2011).

Similarly, the dual processing model’s notion that different intentions and tasks in context affect the appraisal–assessment process confirms this study’s findings on MR and learning environments. MR can be enhanced by several individual and situational factors that strengthen students’ MR in different learning environments during studies (Boekaerts, 2011). Some studies of MR strategies have explicitly highlighted context; for example, they have suggested that efficacy management and environmental structuring are important to students’ commitment to studies, particularly in BL environments, which strongly rely on students’ self-paced studying and independence and on students’ ability to make collaborative study groups effective for themselves (Du, 2016; Xu et al., 2013, 2015). Furthermore, there are studies showing that online studying increases the need for strong interest enhancement, which can encourage students to strive for academic engagement in situations where there are more opportunities for trade-offs and it is easier to drop in and out (Hidi & Renninger, 2006; Sansone et al., 2012). This susceptibility to dropping out is considered a consequence of the absence of social control or pressure when students and teachers are not face-to-face or present at the same time in learning situations (Jowsey et al., 2020). However, in this study, no differences were detected in students’ MR, study well-being, and academic performance when comparing traditional and BL learning environments. Due to these findings and prior research on the increased vulnerability to dropping out in BL environments, this research was interested in exploring MR strategy use in a BL environment more deeply with qualitative methods. By investigating MR in traditional and BL nurse education contexts, this study provides a worthwhile supplement to the existing MR research.

Moreover, related to the learning environments in nurse education context, emotion regulation showed up in this study’s qualitative analysis as an important strategy, at least regarding healthcare students’ MR. This finding might have been the result of the importance of emotion regulation in learning in general, or in the context of nursing studies, or both. Considering this issue is important because the effects of motivational strategies may differ between domains and contexts (Schwinger & Stiensmeier-Pelster, 2012). Emotion processing is a natural part of nursing studies and nurses’ professional competence. Nursing and other healthcare students are used to facing emotionally challenging situations involving patients at clinical training placements. For this reason, they might have been more exposed to emotionally loaded situations during their studies. Be that as it may, this study
underlines the importance of emotion regulation in a healthcare education context and of theoretical frameworks that emphasize the affective side of SRL (e.g., Ben-Eliyahu & Linnenbrink-Garcia, 2013; Boekaerts, 2011; Järvenoja et al., 2020). Other research has specified that different forms of support (e.g., emotional, informational, and instrumental) and the social interaction between students and between teachers and students affect study well-being and engagement in various learning situations (Pyhältö, McAlpine, Peltonen & Castello, 2017; Soini, Pyhältö & Pietarinen, 2010; Vekkaila, Virtanen, Taina & Pyhältö, 2018; Väisänen, 2019). In particular, social support in the learning environment or a lack of it has been shown to result in either increased engagement or disengagement and to further promote or hinder study well-being (Pyhältö et al., 2017; Vekkaila et al., 2018; Väisänen, 2019). The finding that environmental structuring and emotional regulation strategies are outstanding MR strategies in a BL nurse education context strengthens the relevance of supportive factors from an environmental, pedagogical, and social point of view.

In conclusion, the findings of this dissertation provide unprecedented insight into higher vocational education students’ MR and its relation to study well-being and performance during their studies. In an effort to align these findings with Boekaerts’s dual processing SRL model, a “model of MR throughout a study path” was designed based on Boekaerts’s model (see Figure 7). This model design brings forth the central, versatile, and varied role of a student’s MR during studies. In this model, a student’s WM in a learning context and MR are visibly connected and related to individual and situational factors. A student’s MR level over the course of the study path fluctuates from a higher (developed) level to a lower (less-developed) level. This highlights the variability of MR and its vulnerability to shifts, although the level can also stay permanently high or low. A higher MR level influences a student’s WM by bringing it closer to the mastery pathway and mastery with better learning performance. Simultaneously, it brings the student further away from disadvantageous challenges on the study well-being pathway. Conversely, a lower MR level aligns with the study well-being pathway, bringing the student’s WM closer to challenges in study engagement and study burnout. In a professional education context, this MR process starts before studies begin because MR constitutes personal characteristics that can stem from students’ earlier experiences (e.g., self-efficacy beliefs) (Bandura, 1993; Schunk, 2009), and, accordingly, this process continues during studies and after graduation into professional career development in working life.
7.2 Practical implications

This dissertation demonstrates that MR as a part of SRL has many remarkable associations with nursing students’ learning during studies. These findings on nursing students’ MR should not be ignored when encouraging nursing or other healthcare students in their learning, future career development, and well-being. The results of this dissertation study are relevant to undergraduate and continuing nurse education, from the very beginning of nursing studies through the study path to a professional career. Awareness of students’ MR and strong practices to enhance MR should be regarded as essential elements of teaching, tutoring, mentoring, and counselling in order to support nursing students’ and newly graduated nurses’ learning and well-being.

First, this dissertation study emphasizes that appropriate MR supports nursing students’ study well-being and performance, especially in terms of increased study engagement and decreased cynicism. These are notable findings, and they fortify the practical importance of supporting students’ MR during their studies. To support students’ study well-being, teachers, mentors, and study counsellors in nurse education would benefit from identifying students’ various motivational challenges in various situations and understanding MR strategies that might improve the students’ motivation to learn in different situations. For example, having regularly discussions with students about their SRL, collecting feedback, and learning to analyze data on their motivational challenges could help educators to structure teaching, counselling, and learning environments to better support students’ MR. For instance, learning analytics (e.g., learner dashboard data) has been found to be beneficial in supporting students’ personal agency and empowerment in learning.
This study’s findings on enhancing MR strategies can provide useful practical assistance for this kind of approach. These findings confirm that it is worth endeavoring to build up a supportive learning environment and to consider instruction that might help students maintain and bolster their use of several MR strategies at the same time. These findings are of value to all nurse educators and educational policymakers’ intent on maintaining students’ professional learning in contemporary nurse education.

Second, while this dissertation study indicated that nursing students’ higher MR did not help them with exhaustion, it suggests that study burnout symptoms are not a single case, but rather are a systemic problem in which motivation and its regulation play one part (Näykki, Ahonen, Järvenoja & Pyhältö, 2018). It can even be argued that a holistic approach to solving well-being problems is a necessity when we look at, for example, Salmela-Aro and Read’s (2017) study, which showed that over 30% of higher-education students suffer from exhaustion as a symptom of study burnout. This generates many questions for educational policies. What are the appropriate interventions to sustain students’ well-being? Could counselling or collaborative discussions of stress and motivationally challenging experiences prevent students’ feelings of exhaustion? Is there a conflict between students’ SRL skills and some educational requirements? Or is higher MR a sign of students’ too-strict self-discipline, which can exhaust them? Interestingly, recent research on Finnish university students concerning students’ learning profiles and their relation to study-related burnout and academic achievement has shown a relation between surface-level processing in learning and problems in (meta)cognitive SRL strategy use (e.g., understanding and knowledge creation) (Asikainen, Salmela-Aro, Parpala & Katajavuori, 2020). Furthermore, that study suggests that to prevent study burnout, we should pay more attention to supporting students’ learning processes and developing students’ study skills and welfare throughout their studies. Adopting a self-regulatory approach that acknowledges cognitive, motivational, and emotional factors simultaneously can provide a functional framework for developing such support.

Expanding on this idea, this dissertation increases awareness of nursing students’ self-regulative motivational processes, and its findings can be useful in strengthening our understanding that students differ in how they regulate their motivation and the extent to which they utilize MR during their studies (Dörrenbächer & Perels, 2016). The findings of this dissertation can help educators develop tools and ways to recognize challenges in MR and support students in their
MR. Furthermore, educators and academic counsellors can actively engage with students in challenging situations and students who are perceived as at risk. An emphasis can be placed on tutoring or counselling interventions and socially supportive discussions of challenging events in order to bolster students’ MR and study well-being.

Finally, the findings of this study can contribute to the design of more favorable learning environments and educational policies on high-quality healthcare training that facilitates students’ MR and study well-being. This study made visible a variety of MR strategies that nursing students utilize during their studies. Learning environments should provide support for several kinds of MR strategies. Furthermore, both students’ own personal strategies and environmental support (situational support) are important and learning environments should make both internal and external regulation feasible. Even if teaching methods and the learning environment support MR, personal study engagement in learning activities and the MR skills to maintain motivation are still necessary from students. These skills can be developed through environmental and pedagogical practices, such as collaborative learning to enhance students’ emotion regulation (Järvenoja et al., 2020). Likewise, students experience both mastery and performance goal setting as enhancement strategies for their MR in learning. Although mastery goal orientation is particularly beneficial for learners (Pekrun et al., 2006), we should not ignore the significance of performance goal setting either. It can be assumed that, particularly in BL environments where social interaction is more restricted, students might be willing to utilize types of goal setting that are more external in nature but easily observable. For example, they can benefit from digital ePortfolios (Korhonen, Ruhalahti, Lakkala & Veermans, 2020) or certificates that allow them to follow their ECTS accumulation or earn digital badges (Brauer, 2019). These kinds of goals are visually resonant and offer students feedback on their success, which can trigger their motivation to learn. To avoid performance without mastery, it is recommended that both mastery and performance goals are set. In addition, sustaining students’ study well-being calls for suitable challenges and requirements throughout their personal learning path.

In conclusion, this study sheds light on the crucial issue of MR and pedagogical innovations for promoting students’ MR in today’s learning environments. Teachers, other educators, and academic counsellors are encouraged to gain an advanced understanding of SRL and its processes, such as MR. This understanding will help them orchestrate a range of motivation strategies for academic pursuits, even in the face of difficulties or challenges, with the purpose of increasing mastery.
of academic performance and study well-being. Focusing on supporting students’ successful progression and factors that are within the control of nurse education and can be cultivated to facilitate students’ MR and study well-being can contribute to ensure that students will graduate as competent and well-being professionals.

7.3 Future research

Earlier studies have suggested that despite the increase in attention to SRL over the last few decades, research on the regulation of motivation is still in its early stages and has received far less rigorous analysis compared to other aspects of SRL (Kim et al., 2018; Schwinger & Stiensmeier-Pelster, 2012; Teng & Zhang, 2017). SRL researchers have recommended that more attention should be paid to self-regulation as it relates to well-being in understudied learning contexts, such as in professional training settings, highly technological environments, and online education programs (Davis & Hadwin, 2021; Schwinger et al., 2009; Usher & Schunk, 2018; Wolters & Benzon, 2013). Particularly, when BL environments have become more common, there is a need to focus more research on MR in different kind of BL settings. Moreover, this theory could be advanced through research on MR that employs multiple methods to assess the self-regulation of motivation and includes qualitative analysis (Karabenick & Zusho, 2015; Renninger et al., 2011; Wolters et al., 2011). In addition, there is a lack of studies investigating MR using a longitudinal approach (Schwinger et al., 2009, Wolters & Benzon, 2013).

The longitudinal and mixed-method design of this study allowed for the explicit detection of the versatile nature of MR progress. The mixed-method design ensured rich data, deepened understanding of the results, and strengthened the reliability of the findings. However, in future MR studies, it would be beneficial to combine more complementary methods, for example, new forms of data mining that have proven promising in exploring students’ SRL (Biswa, Baker & Paquette, 2018; Cleary & Callan, 2018; Järvelä et al., 2019). As learning analytics is becoming a bigger part of learning environments, future research on MR should involve learning analytics traces and self-reporting methodologies to answer questions of how, pedagogically, by utilizing artificial intelligence, we can contribute to students’ MR processes during their studies. How can we promote learning analytics and learning environments so that they serve students’ MR more effectively? Could learning analytics track traces of MR to help quickly facilitate students’ MR? What are the ethical issues to consider when using learning analytics for these purposes?
In all, this study focused on nursing students’ MR as a part of SRL. Regardless of this relatively narrow angle, motivational processes are inherent parts of SRL. MR has been given less attention in earlier research, especially in healthcare disciplines. Examining nursing students’ learning from a MR perspective was well-limited, novel, and brought richness to the interdisciplinary research on education and health sciences. The findings help us to understand the regulatory mechanisms behind MR and study well-being and performance in a nurse education context and from an educational theory point of view. However, what was not addressed well in this study was the relationship between other central components of SRL, namely the (meta)cognitive, behavioral, and social components. Future studies should strive for a broader focus on these important parts of SRL and should involve a variety of disciplines and larger sample sizes.
8 Conclusion

While the act of learning can be extremely positive for academic performance and well-being, in some cases it can also exacerbate or even cause study burnout symptoms. A growing number of students at universities are experiencing study well-being problems. Additionally, today, global lockdowns and increased remote education have prompted us to think seriously about how to support students’ learning and study well-being, now and in the future, in hybrid and digital learning environments (EU, 2020).

According to the State of the World’s Nursing 2020 report (WHO, 2020), the COVID-19 pandemic has also confirmed how fundamental the role of nurses is within interprofessional health teams. Globally, they form the largest professional group of healthcare workers. They provide vital care in all healthcare circumstances. In the report, the WHO urges all relevant stakeholders to maximize their contributions to enhancing nurse education—especially in terms of faculty, infrastructure, and students—to address global and domestic demands and changes as well as to fulfil competency requirements. Promoting nurse education is seen as vital to society. Countries should provide an encouraging environment for nursing practice to attract and retain nurses and motivate the nursing workforce (WHO, 2020).

Enhancing motivation and study well-being may be a challenge for nurse educators. Even so, they are nonetheless responsible for training healthcare professionals who are able to cope with the challenges of the work. Building resilience in the future healthcare workforce’s ability to regulate motivation and maintain well-being should be a key element of nurse education. Due to these far-reaching personal, professional, and societal consequences, supporting nursing students’ motivational and study well-being early in their professional learning path is extremely important. This dissertation emphasizes that students’ MR is crucial throughout their study path. When appropriately realized, it is versatile, adaptable, and has a positive relationship to study well-being and performance. It can be consciously enhanced either by a student himself or herself or by situational factors, such as pedagogical practices and environmental conditions.

This study provides an opportunity to further develop practical perspectives on MR that can support students’ learning, particularly in healthcare education. This kind of information is important in understanding and encouraging healthcare students’ SRL and motivational endeavors during their studies and later in their professional career development. It is helpful to consider how students’ SRL skills,
in terms of MR, can be scaffolded. The information can help educators to advance their understanding of how, through instructional practice interventions, to support students’ MR, which improves students’ study well-being and performance. Moreover, if we aim to develop better healthcare practices for patients, we need to develop students’ professional learning skills in healthcare education.

However, simply teaching regulatory strategies to students does not guarantee their use, their maintenance, or the transfer of the strategies to new learning tasks in time. To put this into perspective, it is a question of approach: Educators first need to be aware of and get acquainted with the regulatory learning processes and, further, to understand how they can best enhance students’ SRL. Contextualized and embedded self-regulation instruction and practices are needed. Educators should gain an understanding of the motivational aspects of SRL processes that could be incorporated into pedagogy, curricula, assessment activities, and learning environments. This deeper understanding of how students experience and apply appropriate MR could therefore provide an important foundation for effective instructional interventions in educational settings.

Finally, from a societal point of view, this dissertation offers beneficial knowledge. In Finland, the ministry of education and culture has implemented major continuous-learning reform that addresses adult education and work-related learning (OECD, 2020; Opetus- ja kulttuuriministeriö, 2020). Our labor market is changing rapidly due to technological change, globalization, and population ageing. The majority of new jobs created will require high-level skills, meaning that metacognitive skills are becoming more important in working life. Future proficiencies will call for capable self-regulative skills in learning. In the near future, these workforce skills will be key to managing the transition. Professionals need metacognitive and regulative abilities to learn successfully and develop their competence. MR skills are crucial in this learning process, and they can be measured and therefore targeted for enhancement. To make the provision of continuous learning fit for future demands, learning should be tailored to improve students’ motivation to learn. By acting seriously and proactively to improve students’ MR, educators have a better possibility of contributing to students’ high-level skills and, simultaneously, preventing well-being problems from becoming larger and having a negative influence on students’ professional career later in life. This is significant, as the workers of the future should be able to find flexibility, freedom, possibilities, meaning, and balance in their careers. Providing all learners with better opportunities to upskill their performance in learning will improve their well-being and further develop the competitiveness of our society.
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