Helsinki Studies in Education, number 41

Henrika Anttila

How does it feel at school and in teacher education?

Comprehensive school pupils' and student teachers' academic emotions

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Abstract
The aim of this doctoral dissertation is to provide new insights into the dynamics of academic emotions, especially in the socially embedded situations of two cohorts of learners: pupils that are learning *at* the school and student teachers that are learning *for* the school. Both invariant and contextual elements of the academic emotions in these two active groups of learners were analysed. This dissertation consists of three original studies. The focus of the first two sub-studies was on analysing the landscape of student teachers' academic emotions during their studies in different activities provided by teacher education (*Study I*) and on investigating student teachers' emotional patterns and their triggers (*Study II*). Pupils' socially embedded emotions in teacher-pupil and peer interactions in different learning environments of comprehensive school were investigated in *Study III.* In the dissertation a mixed methods approach, has been utilised, combining both qualitative and quantitative methods. The student teacher cohort consisted of 19 students who were finishing their studies, from whom the semi-structured interview data with retrospective narration and visualisation were collected. Picture tasks and survey data were collected from146 sixth and eighth graders.

The results of *Study I* showed that student teachers' emotional landscape is rich and filled with a range of academic emotions. Most commonly, student teachers described positive emotions, from which activating emotions were emphasised. Negative emotions, on the other hand, were typically deactivating. Most of the positive and negative emotions were related to motivational elements. Student teachers' emotional experiences were more commonly embedded in individual activities than in social activities. Moreover, they were situated in the key activities of student teachers' professional development: major subject studies and practice.

The results of *Study II* showed that student teachers' emotional experiences during their studies were constituted from five different emotional patterns (positive, negative, ascending, descending and changing). The patterns were highly motivationally toned and focused on studying and learning. Most of the emotional patterns were positive, filled with experienced enthusiasm and interest, still a fair number of changing patterns were also detected. The patterns were experienced equally in short, medium-length and long episodes, indicating that the negatively-loaded ex-

periences did not accumulate over longer periods of time. The triggers of the patterns were highly task-related and tightly connected to the key elements of studying to become a teacher.

The results of *Study III* showed that the social interactions at school are significant arenas for pupils' emotions. In particular, the informal learning environment was emphasised in peer related emotions. The results also suggested that emphasising negative emotions in teacher-pupil interaction seems to be related to pupils' cynicism and decreased the extent of thriving at school.

This dissertation contributes to the literature on academic emotions by a) providing new understanding of the dynamic nature of academic emotions, especially in the socially embedded situations; b) providing new insights on the invariant and contextual elements of the academic emotions of two cohorts of active learners; c) by proposing an extension of the concept of academic emotions from learning-, teaching- and studying-related emotions to the emotions experienced in the pedagogically orchestrated environments; and d) responding to the need for complementary emotion research by utilising a mixed methods approach.

Keywords: academic emotions, socially embedded academic emotions, student teachers, Finnish teacher education, comprehensive school pupils, Finnish comprehensive school

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Henrika Anttila

Miltä koulunkäynti ja opettajaksi opiskelu tuntuu?
Peruskoulun oppilaiden ja opettajaopiskelijoiden akateemiset tunteet

Tiivistelmä

Väitöskirjassa tarkasteltiin akateemisia tunteita keskittyen erityisesti niiden sosiaaliseen ulottuvuuteen kahden aktiivisen oppijaryhmän avulla. Nämä ryhmät olivat: oppilaat, jotka oppivat koulussa, sekä opettajaopiskelijat, jotka oppivat koulua varten. Näiltä kahdelta oppijaryhmältä kerätyistä aineistoista analysoitiin akateemisten tunteiden muuttumattomia ja kontekstuaalisia elementtejä. Tämä väitöskirja koostuu kolmesta itsenäisestä osatutkimuksesta. Kahdessa ensimmäisessä osatutkimuksessa keskityttiin tarkastelemaan opettajaksi opiskelevien akateemisten tunteiden kirjoa heidän opintopolkunsa aikana (osatutkimus I) sekä akateemisten tunteiden ketjuja ja niiden virikkeitä (osatutkimus II). Osatutkimuksessa III analysoitiin oppilaiden sosiaalisia akateemisia tunteita koulun eri oppimisympäristöissä, opettajan ja oppilaan välisessä vuorovaikutuksessa ja vuorovaikutuksessa vertaisten kanssa. Tässä väitöskirjassa hyödynnettiin monimenetelmällistä tutkimusotetta. Loppuvaiheen opettajaksi opiskelevia (N=19) haastateltiin puolistrukturoiduin teemahaastatteluin, visuaalisia menetelmiä ja retrospektiivistä narraatiota hyödyntäen. Kuudes- ja kahdeksasluokkalaisilta peruskoulun oppilailta (N=146) kerättiin kuvaproduktio- ja kyselyaineisto.

Osatutkimuksen I tulokset osoittivat, että opettajaksi opiskelevien emotionaalinen maisema on rikas ja täynnä erilaisia tunteita. Etenkin positiiviset aktivoivat tunteet painottuivat opettajaksi opiskelevien kuvauksissa. Negatiiviset tunteet puolestaan olivat usein aktivoivuustasoltaan passivoivia. Opiskelijoiden negatiiviset ja positiiviset tunnekokemukset olivat motivationaalisesti värittyneitä. Akateemiset tunteet sijoittuivat hieman useammin opettajankoulutuksen yksilöllisiin tilanteisiin kuin sosiaaliseen vuorovaikutukseen. Lisäksi tunnekokemuksia kuvattiin useimmiten pääaineopinnoissa ja opetusharjoittelussa, jotka muodostavat opettajaksi opiskelevien ammatillisen kehittymisen ytimen.

Osatutkimuksessa II tunnistettiin opettajaksi opiskelevien emotionaalisista kokemuksista viisi erilaista akateemisten tunteiden ketjua (positiivinen, negatiivinen, nouseva, laskeva ja muuttuva). Nämä tunneketjut liittyivät motivaatioon ja olivat vahvasti sidoksissa opiskeluun ja oppimiseen. Opettajaopiskelijat kuvasivat eniten positiivisia tunneketjuja, ja niissä korostui innostus ja kiinnostus. Muuttuvia tunneketjuja he kuvasivat lähes yhtä paljon. Ajallisesti tunnekokemukset näyt-

tivät jakautuvan tasaisesti lyhyisiin, keskipitkiin ja pitkiin. Tunneketjujen virikkeet näyttivät olevan kiinteästi sidoksissa keskeisiin opettajaksi kasvamisen tekijöihin.

Osatutkimus III osoitti että koulun sosiaaliset vuorovaikutussuhteet olivat merkittävä konteksti oppilaiden tunteille. Etenkin informaali oppimisympäristö näyttäytyi keskeisenä kontekstina vertaisvuorovaikutussuhteissa esiintyville tunnekokemuksille. Lisäksi tutkimuksen tulokset osoittivat että oppilaat, jotka kuvasivat enemmän negatiivisia tunteita opettaja-oppilas -vuorovaikutussuhteessa, olivat myös kyynisempiä ja viihtyivät huonommin koulussa.

Tämä väitöskirja edistää akateemisten tunteiden kirjallisuutta seuraavasti: a) avaa uusia näkökulmia akateemisten tunteiden dynaamiseen luonteeseen, etenkin sosiaalisten akateemisten tunteiden osalta, b) rakentaa uutta ymmärrystä kahden oppijaryhmän akateemisten tunteiden muuttumattomista ja kontekstuaalisista elementeistä, c) suosittaa laajentamaan akateemisten tunteiden käsitettä koskemaan kaikkia tunteita, joita koetaan pedagogisesti järjestetyissä oppimisympäristöissä ja d) vastaa monimenetelmällisen tutkimuksen tarpeeseen.

Avainsanat: akateemiset tunteet, sosiaaliset akateemiset tunteet, opettajaopiskelijat, opettajankoulutus, peruskoulun oppilaat, peruskoulu

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In Helsinki, February 2019

Henrika Anttila

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List of original articles

This doctoral dissertation is based on the following three original publications, which are referred to in the text according to Roman numerals (I–III):

I. Anttila, H., Pyhältö, K., Soini, T., & Pietarinen, J. (2016). How does it feel to become a teacher? Emotions in teacher education. *Social Psychology of Education,* 19(3), 451–473. doi: 10.1007/s11218-016-9335-0

II. Anttila, H., Pyhältö, K., Soini, T., & Pietarinen, J. (2017). From anxiety to enthusiasm: emotional patterns among student teachers. *European Journal of Teacher Education*, 40(4), 447–464. doi: 10.1080/02619768.2017.1349095

III. Anttila, H., Pyhältö, K., Pietarinen, J., & Soini, T. (2018). Socially embedded academic emotions in school. *Journal of Education and Learning*, 7(3), 87–101. doi:10.5539/jel.v7n3p87

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1 Introduction

Emotions play a central role in learning. There is solid evidence that emotions are important predictors of academic achievement beyond both intelligence and domain-specific skills (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Previous research has shown that emotions are related to cognitive performance, effective learning strategies, motivation, decision-making, problem-solving, and wellbeing (Damassio, 1994; Hannula, 2012; Lewis, Huebner, Malone, & Valois, 2011; Linnenbrink-Garcia, Rogat, & Koskey, 2011). Learning is not only affected by emotions, but emotional reactions are largely learned in the interplay with the social environment. Individuals can learn to regulate their emotions, and to create emotionally optimal learning environments. Thus, it is hardly surprising that emotions have become a growing area of interest among both scholars and education practitioners, ranging from administrators to teachers. In recent years, the importance of emotions has also been acknowledged in Finnish educational policy agendas. For the first time, social and emotional skills have been described as learning goals of the basic education (Finnish National Board of Education, 2014).

Academic emotions are not only achievement- and task-related, but also widely experienced in social interactions. Social environments within educational settings provide a major source for eliciting emotions (Baumaister & Leary, 1995; Martin & Dowson, 2009) and school is fulfilled by social encounters. The social interactions at school provide a significant arena for emotions that not only contribute to achievement (e.g. Beilock, Gunderson, Ramirez, & Leine, 2010; Furrer & Skinner, 2003; Ulmanen, Soini, Pietarinen, & Pyhältö, 2016; Véronneau & Vitaro, 2007; Wentzel & Caldwell, 1997; Witkow & Fuligni, 2010), but also to overall school experience (e.g. Aritzeta, Balluerka, Gorostiaga, Alonso-Arbiola, Haranburu, & Gartzia, 2016). The social interactions that create, influence, shape and transfer pupils' academic emotions are likely to have an impact on their teachers' and peers' emotional experiences. Still, as pointed out in a recent study, the social embeddedness of academic emotions has been neglected in previous research (Uitto, Lutovac, Jokikokko, & Kaasila, 2018).

While pupils' school experience is coloured by their academic emotions, student teachers' journey towards becoming professional teachers is emotionally embedded. Student teachers are learning for their future profession in comprehensive school in order to be able to guide their future pupils' learning and development. This also includes fostering their emotional skills in the classroom. Student teachers' own academic emotions are likely to reflect not only on their learning during their teacher education studies, but also on their experiences as in-service teachers (e.g. Eren, 2013; Rowe, Fitness, & Wood, 2015). Accordingly, their readiness for identifying, expressing, regulating and understanding the impact of emotions in

studying is likely to reflect on their teaching, having an impact on their future pupils. However, the prior research on academic emotions has mainly focused on certain emotional states, especially anxiety, enjoyment and lately also on boredom (e.g. Becker, Goetz, Morger, & Renellucci, 2014; Goetz, Frenzel, Hall, Nett, Pekrun, & Lipnevich, 2014; Reindl, Tulis, & Dresel, 2018). It can nevertheless be expected that the emotional experiences in academic settings are likely to be richer than those prior studies have suggested (Pekrun, 2005). Still, a comprehensive picture of academic emotions in education is lacking. Accordingly, there is a gap in the literature on pupils' and student teachers' academic emotions in various educational practices, how emotions are patterned and what triggers emotional patterns while engaging in academic activities.

The aim of the work behind this doctoral dissertation is to understand the nature of academic emotions, especially in socially embedded situations, focusing on two cohorts of active learners, connected by the same context: pupils who are learning *at* the school, and student teachers who are learning *for* the school. To reach this aim, student teachers' emotional landscape, emotional patterns and their triggers during the study path to become a professional in-service teacher were identified in *Studies I* and *II*. In addition, pupils' socially embedded academic emotions were investigated in teacher-pupil and peer interactions during formal and informal school activities (*Study III*). This doctoral dissertation contributes to the gap in the literature on academic emotions by: a) providing a better understanding of the nature of academic emotions, especially in socially embedded situations; b) providing new insights into the invariant and contextual elements of the academic emotions of two groups of learners; c) by proposing an extension of the concept of academic emotions from learning, teaching and studying related emotions to the emotions situated in the pedagogically orchestrated environments; and d) utilising a mixed methods approach in academic emotion research, which is still lacking (e.g. Bieg, Goetz, & Lipnevitch, 2014; Pekrun & Linnenbrinck-Garcia, 2014; Pekrun & Schutz, 2007)

1.1 Function of emotions

To understand the role of emotions at school and while studying to become a teacher, the basic function and nature of emotions needs to be explained. Common to almost all emotion theories is that emotions are seen as intense and short-lived active states that are bound to specific eliciting stimuli (Do & Schallert, 2004; Ekman, 1992; Schutz, Hong, Cross, & Osbon, 2006). Emotions are considered to be episodes that can be expressed in multiple ways and are shaped by social contexts (Schutz et al., 2006). They are comprised of five distinctive, but complementary, components: *affective, physiological, cognitive, expressive* and *motivational components* (e.g. Frenzel & Stephens, 2013, Plutchik, 2001; Russell, 2003; Shuman & Scherer, 2014). *The affective component* is the core of emotion that is the

subjective and individual experience (Hascher, 2010). The affective component can be felt, and it distinguishes emotions from other thoughts and cognitive mental states (Frenzel & Stephens, 2013).[1] The *physiological component* of emotions refers to the bodily processes such as an increased heart rate, dilated pupils and sweaty palms (Shuman & Scherer, 2014). These bodily processes may be experienced in a situation in which a learner is experiencing test anxiety. These physiological processes occur in both body and brain (Frenzel & Stephens, 2013). *The cognitive component* of emotions refers to the arousal of different thoughts during emotional experiences, such as worry over possible failure (e.g. Hascher, 2010). Moreover, emotions are characterised by an *expressive component* that make emotions recognisable to others and are displayed during emotional experience, such as facial expressions, body movements and postures (e.g. Frenzel & Stephens, 2013; Shuman & Scherer, 2014). Finally, *the motivational component* refers to the behavioural aspect of emotions. The motivational component serves to promote the evolutionary fight or flight function that helps individuals to preserve their survival and wellbeing (Frenzel & Stephens, 2013). These five components have their own specific purposes that together form the function of emotion: the affective component serves for monitoring function; the physiological component induces action; the cognitive component helps to make sense of the present situation; the expressive component serves for communication; and the motivational component enables fast movements (e.g. Schuman & Scherer, 2014). In this doctoral dissertation, episodes comprising these components, with the specific object of activity, are seen as *emotions*.

Emotions differ from other affective states and dispositions. For example, it has been suggested that moods and emotions differ from each other in terms of the duration, intensity and the object of the activity (Schutz et al., 2006). Moods tend to be longer-lasting, more enduring and less specific than emotions, although in some cases it can be hard to make a distinction (Fiedler & Beier, 2016). Furthermore, the origin of mood is commonly unknown and thus, it does not have a specific object. Moods are also more difficult to bypass and control than specific emotions (Fiedler & Beier, 2016). However, as moods and emotions show similar qualitative differences, some researchers view them as being lower intensity emotions (Pekrun, 2006). The basic function of moods shares similarities with the function of emotions. As emotions come and go, long-lasting moods are also necessary for guiding our evolutionary need to go forward towards safety and away

[1] Especially in everyday life, the word feeling is sometimes used to as a synonym for emotion, although rather refers to the affective component of the emotion (Shuman & Scherer, 2016).

from danger. In addition, moods function as regulators of our psychological well-being. [2]

In general, positive emotions are seen as a symbol of psychological wellbeing and source of several positive attributes, such as goal pursuit, broad scope of attention and close social bonds (Fredrickson, 1998; Gruber, Mauss, & Tamir, 2011; Janssen, de Hullu, & Tigelaar, 2008). Human beings have a tendency to prefer positive emotions over negative ones, either by changing the negative emotions to positive or keeping the positive emotions alive (Tamir, 2009). Thus, emotions can change and evolve over time (Sonnemans & Frijda, 1994) and this can result in specific emotional patterns in a given situation. Accordingly, emotional experiences are not typically constituted by a single emotion, but rather from a pattern of different emotions (Pekrun & Linnenbrink-Garcia, 2014) through which every emotion has the opportunity to recruit others (Izard & Youngstrom, 1996). An emotional pattern can be formed from two or more emotions that are triggered in the same situation and can last from a few minutes up to several hours or even longer periods of time (Izard & Youngstrom, 1996; Verduyn, Van Mechelen, & Tuerlinckx, 2011). Accordingly, the function of modifying our emotional states is associated with emotion regulation, in which the goal is to maximise the utility of the emotional experiences by fostering emotions that are more useful in terms of the goal achievement (Tamir, 2009).

1.2 Academic emotions

In the previous literature, emotions that are aroused in educational settings while studying, teaching and learning are referred to as *academic emotions* (e.g. Pekrun, Goetz, Titz, & Perry, 2002). For a long time, research on academic emotions was scarce, with the exception of test anxiety (e.g. Mandler & Sarson, 1952; Stough & Emmer, 1998). In the last decade, research on academic emotions has expanded, and researchers have identified emotions such as pride, hope, enjoyment, disappointment and frustration, to be experienced during learning and studying (e.g. Goetz, Frenzel, Pekrun, Hall, & Lüdtke, 2007; Pekrun, Goetz, Titz, & Perry, 2002). Still, the spectrum of different emotions experienced in educational settings is wider and one could argue that every emotion that can be experienced in everyday life can also be triggered while engaging in pedagogical activities. Therefore, the term academic emotions can be broadened to include all emotions experienced in pedagogical settings. For example, comprehensive school and teacher education are always pedagogically orchestrated environments and comprise not only formal learning environments, but also informal ones. Furthermore, they require motivation, task-orientation and similar learning processes. In this

[2] Terminology wise, a difference should also be made between emotions and affects. Affect can be seen as a wider category that includes both emotions and moods, among attitudes, preferences and affect dispositions (Scherer, 2005; Schuman & Scherer, 2016).

dissertation, the term academic emotion is used to refer to all emotions that are related, described or experienced in the pedagogical designs of academic settings.

Based on the seminal work of Pekrun and others (2002) academic emotions are constructed from two fundamental dimensions: the valence (i.e. emotions with positive or negative charge) and the arousal (i.e. the state of physiological activation of the emotion). Pleasant emotions, such as enthusiasm, happiness and relief are categorised as positive emotions. In contrast, anxiety, sadness and boredom are negative ones. However, the activation level of these academic emotions differs. Enthusiasm and anxiety are considered to be activating emotions, with high levels of arousal. Relief and boredom, on the other hand, are seen as deactivating emotions, due to the low intensity of their physiological emotional reaction. In addition, the literature has acknowledged academic emotions that are neutral in terms of their level of activation. For example, sadness and happiness fall under this category.

In this sense, it is important to take a closer look at the valence of academic emotions and its function for learning. Positive emotions in educational settings are seen as particularly important as they are at the core of students' intrinsic motivation and interest, and thus highly important for their willingness to engage in learning activities (Hidi & Renninger, 2006). Furthermore, positive academic emotions have been shown to be associated with better academic performance, self-efficacy and more effective use of learning strategies (e.g. Mega, Ronconi, & De Beni, 2014; Pekrun et al., 2002; Ruthig, Perry, Hladkyj, Hall, Pekrun, & Chipperfield, 2007; Trigwell, Ellis, & Han, 2012). They have a positive impact on students' evaluation of their own learning, their strategic preparation for exams, and their metacognitive reflection during study (Mega, Ronconi, & De Beni, 2014). Negative emotions in educational settings, on the other hand, have been shown to decrease motivation, direct attention away from the task at hand, and reduce academic achievement (Blair, 2002; Lewis et al., 2011; Pekrun et al., 2002). However, it must be noted that positive academic emotions do not automatically result in positive learning outcomes or vice versa. Here, the arousal level of the emotion plays an important role. Positive deactivating emotions such as relief and contentment, can be counterproductive and can reduce both motivation and task orientation. In addition, negative deactivating emotions can be considered to be the most problematic in terms of learning, since they reduce attention and may lead to shallower and more superficial information processing (e.g. Pekrun et al., 2002).

The effect of negative activating emotions is more equivocal in educational settings, as they may have either a positive or negative impact on learning (Goetz et al., 2014; Pekrun et al., 2002). It has been shown that negative activating emotions may trigger learners' extrinsic motivation and hence increase their efforts in studying and eventually result in better achievement (Pekrun, Muis, Frenzel, & Goetz, 2017). Goran and Negoescu (2015) also proposed that in some situations, anxiety may even be considered to be a precondition for emotionally optimal

learning since it improves both attention and learning capacity. From this perspective, negative activating emotions are seen as a natural part of successful learning and problem-solving processes (Litmanen, Lonka, Inkinen, Lipponen, & Hakkarainen, 2012). High motivational states (such as flow) require both the challenge and the skills to be at a high level and in balance, but some level of anxiety could also be experienced (Inkinen, Lonka, Hakkarainen, Muukkonen, Litmanen, & Salmela-Aro, 2014; Litmanen et al., 2012). Thus, it seems that the key is to maximise the utility of the emotions experienced by fostering academic emotions that are useful for goal achievement (Tamir, 2009). To attain their long-term learning goals, learners should find a balance between their desire for immediate positive emotional experiences and wanting to delay the negative ones. Hence, anxiety while working on a difficult task may actually be more beneficial for attaining long-term learning goals than positive deactivating emotions. Previous research has found out that in terms of a successful learning process, a balance of both high and low arousal academic emotions is needed (Rowe et al., 2015).

Different academic contexts evoke different academic emotions in individuals, indicating that the emotions are domain-specific at least to some extent (Goetz, Frenzel, Pekrun, & Hall, 2006). Accordingly, learning in different domains may lead to different academic emotions. For instance, studying mathematics may create repeatedly different emotions in certain students than studying languages (Goetz et al., 2007). It has been shown that female students experience less enjoyment and pride, but more inefficacy and anxiety during mathematics lectures (Frenzel, Pekrun, & Goetz, 2007b; Frost, Hyde, & Fennema, 1994; Hannula, 2011). The relationship between academic emotions and domain seems to be stronger in mathematics, and less consistent in domains such as languages (Goetz et al., 2007).

Traditionally, researchers differentiate more habit-like trait emotions from momentary state emotions (e.g. Diener, 1999; Shuman & Sherer, 2014). The term 'trait emotion' refers to an individual's personal tendencies to react with certain emotions regardless of the situation or context. Previous research on academic emotions has focused heavily on assessing the trait-like emotions with questionnaires (e.g. Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011; Zeidner, 2007). In these, students have been asked to report on their emotional states in general. However, recently more interest in the state of emotions, that is, momentary-like and situation-specific emotional experiences, has also been paid attention to in educational settings (Nett, Bieg, & Keller, 2017). As all academic emotions are context-dependent and experienced in a certain moment or situation, it may be argued that when state emotions are experienced several times over, they become more trait-like emotions. In this manner, trait emotions can be seen as a result of learning. Still, some researchers argue that even though trait emotions are seen as being more stable emotional experiences compared to state emotions, they are not unchangeable and the interaction of the learner and the learning environment may

shift the trait tendencies (e.g. Lindblom-Ylänne & Lonka, 1998; Vermunt & Minnaert, 2003). Pekrun et al. (2011) further argued that academic emotions that are experienced over a longer period are located in between the trait and state ends.

As emotional experiences are typically constituted from multiple emotions (Boekaerts, 2003; Pekrun & Linnenbrink-Garcia, 2014), an event during a class or lecture may elicit multiple positive and negative academic emotions. For example, learners can experience pride in their own success, joy of learning, admiration towards the teacher, and frustration caused by misbehaviour by other learners. Furthermore, a learning situation may trigger both positive and negative emotions in some learners, but only negative emotions in others. Emotional experiences that are loaded with only negative academic emotions may limit performance more than experiencing both positive and negative academic emotions in the same situation.

Previous research on academic emotions has implied that the emotions play a highly important role in learning. However, academic emotions are not only important for learning, they can be also considered to be the object of it. Learning about our own emotions and the emotions of others lies in the core of the social interactions of education. Still, the knowledge of socially embedded academic emotions in educational settings is quite limited.

1.3 Socially embedded academic emotions

Learning in pedagogical designs is rarely experienced in isolation, but rather it is situated in social interactions between other people, whether they are peers or educators. If you take a closer look at classroom or teacher education, you can immediately notice how many social encounters they produce every day. Thus, one could argue that these relationships are filled with emotions that further have a significant impact on learning. The idea of social construction of emotion is hardly new, and prior studies have shown that social relationships shape the way emotions are experienced, expressed, and regulated (e.g. Keltner & Haidt, 1999; Parrott, 2001). However, the social embeddedness of emotions is highly underrepresented in the literature on emotion (Fisher & Kleef, 2010) and particularly it has scarcely been studied in academic settings.

Traditionally, a distinction between *basic emotions* and *social emotions* has been made. Basic emotions are considered to be universal, evolutionary shaped, biologically prewired and intimately related to survival functions. For instance, enjoyment, anger, disgust, fear, surprise and sadness are considered to be basic emotions (Levenson, 2011). Social emotions, on the other hand, refer to emotions that emerge later in life, require certain cognitive abilities and are learned during social activities and interactions (e.g. Lewis, 2004). Social emotions include shame, pride, guilt, love, jealousy and admiration. They are considered to be

aroused in encounters with other people and require specific situations and a large number of factors to be elicited (Leary, 2000; Lewis, 2004).

Nonetheless, both basic and social emotions are experienced in social situations. Furthermore, basic emotions also resulted from learning in the sense that social interactions influence and modify the way these emotions are experienced and expressed. From this perspective, all emotions experienced in the interaction with other people can be considered to be social emotions. Accordingly, all emotions that are embedded in social interactions and situated in pedagogically orchestrated learning environments are referred in this doctoral dissertation as *socially embedded academic emotions*. Accordingly, this includes emotions that are situated in teacher-pupil and peer interaction, but also in the interaction between pupils and parents or other professionals at school, for example.

The social embeddedness of academic emotions has different forms and functions. Accordingly, learners' subjective emotions and unique emotional experiences can also be experienced and shared at a group level in greater intensity (Shteynberg, Hirsh, Apfelbaum, Larsen, Galinsky, & Roese, 2014). At a group level, emotions are influenced by two factors: the level of identification in the group and the appraisal of the event (Goldenberg, Saguy, & Halperin, 2014). The group members' personality, their values, interests and the type of event shape the appraisals (Mackie, Devos, & Smith, 2000; Smith, 1993). For example, group work may create positive emotions in learners and support their motivation or arouse negative emotions due to conflicts in goals or personal demand leading to decreased motivation or even withdrawal. The emotions at a group level differ from collective emotions, as group-level emotions refer to individual emotional experiences related to group-based events, whereas in collective emotion, the majority of the group members share the same emotional experience (Goldenberg et al., 2014). Thus, collective emotions are group-level emotions that large numbers of individuals experience at the same time in a certain situation (Niedenthal & Brauer, 2012). At a collective level, learners may experience admiration towards their teacher or educator.

The main function of the social embeddedness of the emotion is communication and emotional transfer. Emotions help us to understand others and them to understand us. For example, formal learning environments, such as the classroom, is characterised as a hub of interactions with multitude of social exchanges (Frenzel, Becker-Kurz, Pekrun, Goetz, & Lüdtke, 2018) and thus education provides a central arena for sharing and transferring emotional experiences. Still, previous research on such settings has been limited (Frenzel et al., 2018). Emotions are repeatedly communicated to other people to provide information about our emotional state, perceptions of the world, and the nature of relationship with others (e.g. Fridlund, 1991; Hess & Kirouac, 2004; Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998; Rimé, Mesquita, Philippot, & Boca, 1991). Thus, communicating our emotions is a central part of everyday interaction helping us to relate with

others and making it possible to step into another person's shoes (Ioannidou & Konstantikak, 2008). This is particularly common in an educational environment in which leaners verbally communicate their school-related emotional experiences to others. However, some emotions are more typically shared and communicated than others. It has been shown that experiences of anger are more commonly shared and communicated to others than experiences of fear and sadness (Brans, Van Mechelen, Rimé, & Verduyn, 2013). The emotional sharing also tends to shorten the duration of the emotional experience.

In addition to intentional emotional sharing, individuals also tend to pick up their social partner's emotions (Coviello, Sohn, Kramer, Marlow, Franceschetti, Christakis, & Fowler, 2014) and this has been shown to take place at schools as well (e.g. Reindl et al., 2018; Frenzel et al., 2018). In social interactions, emotions are contagious and can be disseminated through non-verbal clues, such as expressions and gestures, as well as in the pitch, loudness and timbre of voice (Pekrun et al., 2017). The emotional contagion theory suggests that a teacher's emotions can be transferred to learners during interchanges in formal teaching and learning, and vice versa. Previous studies on emotional transfer have focused on exploring the two steps of this process: mimicry and emotional contagion.

Mimicry has generally been considered to be an automatic process in which others' emotions are imitated in order to synchronise and coordinate social interactions (Fischer & van Keef, 2010). For example, at school, pupils may imitate their peers' emotions about bullying through an empathy process even though they do not share the actual emotional experience. Furthermore, the second step of the process, emotional contagion, happens in response to physiological feedback from mimicry (Kelly & Barsade, 2001). The feedback is transmitted to learners' central nervous system that is responsible for emotional experiences. This leads to a situation in which a pupil experiences the same emotion as the peer. At best, emotional transmission can smoothen the social interface and create emotional closeness (Barsade, 2002; Hatfield, Cacioppo, & Rapson, 1994). It may be argued that emotional contagion is the key to shaping the emotional environment of educational settings. Thus, learners' awareness about teachers' and peers' emotions during formal teaching and learning may promote high-quality interaction and further enhance motivation, learning, and the closeness in peer and teacher(educator)-learner interactions that is experienced.

1.4 Student teachers' academic emotions during teacher education

Previous studies on teachers' emotions have emphasised teachers work as being highly emotional (e.g. Hargreaves, 2000; Nias, 1996; Mayer, 2009; Mevarech & Maskit, 2014; Postareff & Lindblom-Ylänne, 2011). These studies also showed that emotions play an important role in teachers' professional learning, identity

and wellbeing (Day & Leitch, 2001; Shapiro, 2010). Still, teachers' academic emotions have been neglected in emotion research (Rosiek, 2003; Sutton, Mudrey-Camino, & Knight, 2009). Although, teachers' emotions have recently gained increased attention from researchers, the literature on emotions in teacher education is still scarce (e.g. Mevarech & Maskit, 2014; Uitto, Lutovac, Jokikokko, & Kaasila, 2018). Academic emotions that student teachers learn, experience, describe and regulate during their professional development may also follow them to their future classroom and have an impact on themselves but also on their pupils. Thus, there is a need for a more comprehensive understanding of the academic emotions of student teachers.

Teacher education provides the primary learning environment for student teachers by offering a wide variety of practices to participate in. These practices induce different emotions in student teachers. That is, interacting with educators and pupils during teaching practice, taking exams, attending lectures and working in small groups have been shown to evoke different positive and negative emotions among student teachers (e.g. Caires & Almeida, 2007; Ketonen & Lonka, 2012; Litmanen et al., 2014; Timoštšuk & Ugaste, 2012).

Student teachers are learners as they are studying for a higher degree and even further for a profession. Thus, the emotional experiences that student teachers undergo during their studies can be considered to be academic emotions. Accordingly, previous studies showed that experiencing emotions during studying to become a teacher is the key for meaningful learning (Kostiainen, Ukskoski, Ruohotie-Lyhty, Kauppinen, Kainulainen, & Mäkinen, 2018). Student teachers' positive activating emotions are critical for successful study in teacher education, but negative activating emotions such as anxiety, may also lead to study success (Ketonen & Lonka, 2012). In addition, Litmanen and others (2012) showed that student teachers enjoyed inquiry-based learning more than teacher-centred learning, even though they experienced it as being more demanding. Positive activating emotions have also been shown to be related to student teachers' self- and co-regulated learning (Saariaho, Anttila, Toom, Soini, Pietarinen, & Pyhältö, 2018).

Earlier studies on student teachers' academic emotions during teacher education have focused heavily on teaching practice (Timoštšuk & Ugaste, 2012; Hascher & Hagenauer, 2016; Timoštšuk, Kikas, & Normak, 2016; Yuan & Lee, 2016) implying that teaching practice is one of the more significant arenas for emotions in teacher education. It has been shown that student teachers' emotional experiences in teaching practice are heavily loaded with both positive and negative emotions (Malderez, Hobson, Tracey, & Kerr, 2007; Timoštšuk & Ugaste, 2012; Yeung & Watkins, 2000). Timoštšuk and Ugaste (2012) showed for instance, that student teachers' positive emotions during teaching practice were related to encounters with their pupils. They experienced joy when interacting with pupils, appreciated of their relationship with them and were excited when witnessing them learn (Timoštšuk & Ugaste, 2012). However, teaching practice has also

a tendency to evoke negative emotions that are provoked by a mismatch between student teachers' expectations and the classroom reality, their own lack of competence and forced adaption to institutional norms (Hagger & McIntyre, 2006). Furthermore, strong negative emotions have been shown to be related to teacher educators in both the university and in the training schools (Timoštšuk & Ugaste, 2012). Previous findings regarding the overall emotional tone of teaching practice have been contradictory. Some studies have shown that teaching practice evokes a mainly intense set of positive emotional experiences (Hascher & Hagenauer, 2016; Timoštšuk et al., 2016), whereas some studies have accentuated the predominance of negative emotions in teaching practice (Timoštšuk & Ugaste, 2012). The significance of teaching practice as an emotional learning environment is therefore undeniable. However, teacher education comprises many learning environments in addition to teaching practice, and together they form the basis of student teachers' learning and related academic emotions. Still, empirical evidence about the spectrum of student teachers' emotions and the context of their emotional experience is not extensive (Eren, 2013).

Previous studies have concentrated particularly on emotional aspects of student teachers' professional development (Bloomfield, 2010; Timoštšuk & Ugaste, 2012; Yuan & Lee, 2015). As teachers' professional identity is fundamentally interrelated with their academic emotions (Zembylas, 2005), it is hardly surprising that these emotions also play a vital role in student teachers' social learning and in becoming a teacher (e.g. Timoštšuk & Ugaste, 2012; Yuan & Lee, 2015). Early career teachers commonly experience an 'emotionally loaded reality shock' (e.g. Veenman, 1984; Kim & Cho, 2014), anxiety over the complexity of teaching and uncertainty about achieving demanding goals in the classroom (Sutton & Wheatley, 2003). These emotional experiences regulate teachers' considerations of leaving the profession (Heikonen, Pietarinen, Pyhältö, Toom, & Soini, 2017; Hong, 2012). Thus, it can be argued that the emotional experiences student teachers undergo while studying to become a teacher affect their future professional development and perceived success as a teacher.

Teacher education is also a highly social environment, including peers, pupils, teacher educators (both at university and in practice schools) and administrative staff. As the complexity of social interactions during teaching and learning is shown to induce intense emotional experiences (Bahia, Freire, Amaral, & Estrela, 2013), it may be argued that social interactions are intertwined with student teachers' emotional practices (Yuan & Lee, 2015). However, the social aspect of student teachers' emotions has been under-considered in earlier research. In a recent study, Kostiainen and others (2018) suggested that the ability to experience and express emotions between peers is one of the more important factors of meaningful learning, one which contributed further to student teachers' sense of engagement and participation to the course (Kostiainen et al., 2018). As the teaching

profession is highly emotional and teachers are constantly battling whether to express, fake or suppress their emotions, teacher education plays a key role in teaching student teachers about how to create emotionally optimal learning environments that promote pupils' meaningful learning and emotional wellbeing. Furthermore, teachers' work is intertwined with social relationships and thus understanding the social aspect of emotions, especially in teacher-pupil interaction, would be something that should be stressed during teacher education.

1.5 Socially embedded academic emotions in teacher-pupil interaction

Teachers are considered to be the focal point of many social exchanges at school and are responsible for organising classroom interactions (Mainhard, Oudman, Hornstra, Bosker, & Goetz, 2018). Previous research has acknowledged the role of teacher-pupil interaction for pupils' achievement (Allen, Gregory, Mikami, Lun, Hamre, & Pianta, 2013; McCormick & O'Connor, 2015), learning behaviours (e.g. Roorda, Koomen, Spilt, & Oort, 2011), school adjustment (Baker, 2006; Birch & Ladd, 1997), engagement (Ulmanen et al., 2016), and teachers' as well as pupils' wellbeing (Roorda et al., 2011; Spilt, Koomen, & Thijs, 2011).

Accordingly, the interaction between a teacher and pupils plays an important role and is thus also bound to raise a wide range of positive and negative emotions in both parties (e.g. Hargreaves, 2000; Sutton & Wheatley, 2003; Gläser-Zikuda & Fuβ, 2008; Frenzel, Goetz, Lüdtke, Pekrun, & Sutton, 2009a; Maria, Dos Santos, & Mortimer, 2003). Even though teacher-pupil interaction is seen as one of the more powerful in terms of evoking teachers' emotions (e.g. Sutton & Wheatley, 2003), the emotional aspect of the interaction has been widely neglected in the literature (Uitto et al., 2018).

Previous studies have shown that emotions have an impact on how teachers build and foster relationships with their pupils (Yan, Evans, & Harvey, 2011), but the quality of the relationship is also highly related to teachers' emotions. For instance, teachers who experience closeness with their pupils have been shown to report more positive emotions such as joy and less frequently negative emotions such anxiety and anger (Hagenauer, Hascher, & Volet, 2015). Furthermore, there is evidence that pupils' classroom behaviour especially arouses emotions in teachers (Frenzel et al., 2018; Frenzel, Goetz, Pekrun, & Jacob, 2009b; Hagenauer et al., 2015). For example, pupils' misbehaviour in the classroom is associated with the anger experienced by teachers (Chang, 2013). On the other hand, teachers' positive emotions are frequently related to highly motivated and engaged pupils and their good academic performance (e.g. Frenzel et al., 2009b; Hagenauer et al., 2015; Hargreaves, 2000). Moreover, positive emotions in teacher-pupil interaction are found to be related to both pupils' and teachers' wellbeing at school (e.g. Pekrun et al., 2017). For example, positive emotions in teacher-pupil interaction

are seen as a buffer for teachers' stress in everyday life (Grams & Jurowetzki, 2015), whereas negative emotions have a prevailing impact on their occupational wellbeing (Chang, 2013; Chang & Davis, 2011).

Uitto and others (2018) have pointed out that earlier studies on emotions in teacher-pupil interaction have rarely focused on investigating academic emotions from the pupils' point of view. However, teachers may be more important for pupils' emotions than previous studies have recognised (Mainhard et al., 2018). There is some emerging evidence on this. Pupils' perceptions of teachers' agency and communication have been shown to have an impact on pupils' emotions (Mainhard et al., 2018). In particular, pupils experienced enjoyment, anger, and anxiety related to teachers' instructional behaviour (Becker et al., 2014; Gläser-Zikuda & Fuβ, 2008; Sarason, 1984). For example, lack of feedback from teachers, unstructured learning material, unclear instructions and excessive external teacher control have been shown to cause negative emotions such as anxiety and anger in pupils (Rantala & Määttä, 2012; Sarason, 1984; Ulmanen et al., 2016; Becker et al., 2014).

There is also evidence that teachers' emotions have an impact on pupils' emotions through emotional transmission. For instance, Becker and her colleagues (2014) showed that perceived teachers' emotions significantly predicted pupils' emotions in the classroom, implying that teachers' emotions are as important for pupils' emotions as their instructional behaviour. Furthermore, in a recent study, Frenzel and others (2018) suggest that teachers' enjoyment is positively-linked to pupils' enjoyment in class to the extent that it translates back into the teachers' displayed enjoyment while teaching. In general, pupils associate good teachers with positive emotions (such as sympathy, admiration and gratitude) and negative emotions (such as embarrassment and shame) with incompetent teachers (Day & Qing, 2011).

There might also be differences between different grade levels regarding emotions experienced in classroom. For example, it has been shown that class-teachers experience more teaching-related positive emotions than subject teachers (Hagenauer et al., 2015). Hagenauer and others (2015) suggest that this difference may be due to the time spent with the pupils. Class-teachers spend more time with their pupils and thus have more opportunities to create close relationships with each other. In addition, it can be argued that the significance of the relationship between a teacher and pupils declines in the transition from primary to secondary school (Pietarinen, Soini, & Pyhältö, 2014; Symonds & Galton, 2014) as the peer relationships tend to become emotionally better and more important (Symonds & Galton, 2014).

1.6 Socially embedded academic emotions in peer relationships

Earlier studies exploring pupils' academic emotions through social environments have focused on the influence of teachers and parents (Reindl et al., 2018) although peers are seen as having an extremely important social influence on adolescent development (Gauvain, 2016). Social relationships with peers contribute on pupils' emotional, physical, social, and cognitive growth (Gauvain, 2016). Furthermore, pupils' peer relationships at school and in the classroom are acknowledged as being an integral feature of their learning environment. Thus, it can be argued that the socially embedded academic emotions in peer interactions are significant determinants of pupils' everyday school experiences. Positive emotions experienced in relationships with peers, feelings of acceptance and sense of belonging to a peer group have been shown to be crucial for pupils' positive development and their physical and mental wellbeing (Bacete, Perrin, Schneider, & Blanchard, 2014; Rubin, Bukowski, & Laursen, 2009). Positive emotions help pupils to develop their social skills and to cope with challenges that life throws at them (Hoferichter, Raufelder, & Eid, 2015; Rubin et al., 2009; Steinberg & Morris, 2001). Positive emotions in peer relationships have also been shown to reduce stress and anxiety (Hoferichter et al., 2015; Rubin et al., 2009; Steinberg & Morris, 2001).

These positive socially embedded emotions have been shown to be generated typically in close friendships and peer networks. Accordingly, children commonly label themselves as being part of a group or left outside it. Peer exclusion is frequently experienced by adolescents (Franger, Frankel, & Hazen, 2012) eliciting negative emotions such as anxiety and loneliness (e.g. Acquah, Topalli, Wilson, Junttila, & Niemi, 2016; Graham & Juvonen, 1998; Juvonen, Nishina, & Graham, 2000; Veenstra, Lindenberg, Huitsing, Sainio, & Salmivalli, 2014). Moreover, if peer exclusion is a frequent and highly dominant experience, it may lead to negative emotions to both schoolwork and peers in general, and further cause social anxiety and even depression among pupils (Graham & Juvonen, 1998; Juvonen, et al., 2000; Pekrun et al., 2017). As such, repercussions of peer exclusion may have an impact on the social environment at school.

Emotions in peer relations contribute not only to the social environment but also to the pupils' academic engagement and achievement (Furrer & Skinner, 2003; Linnenbrink et al., 2011; Ulmanen et al., 2016; Véronneau & Vitaro, 2007; Wentzel & Caldwell, 1997; Witkow & Fuligni, 2010). Emotional experiences in educational settings have been shown to be transferable not only between teacher and pupil, but also between peers. In a recent study, Reindl and others (2018) showed that best friends enjoyment and boredom indirectly influenced pupils' achievement through experienced enjoyment and boredom in mathematics and English. Thus, the peer impact on pupils' academic performance may be even

greater than earlier suggested. Moreover, as positive emotions promote pupils' enjoyment of learning, that can further increase their efforts and odds for good academic performance (e.g. Pekrun et al., 2002; Pekrun, Goetz, Perry, Kramer, & Hochstadt, 2004). It can therefore be argued that positive peer relationships are also highly important from a teacher's point of view. For example, in a classroom in which the pupils' peer relationships are productive and supportive, instructional practices and behavioural disruptions are minimised (Hamm & Hoffman, 2016). Furthermore, teachers who are emotionally supportive may create learning environments in which pupils experience higher acceptance of each other (Mikami, Gregory, Allen, Pianta, & Lun, 2011) and are thus likely to experience more positive emotions in peer relationships. However, the effects of positive emotions experienced in peer interactions may actually be equivocal in terms of academic success. In addition to increased commitment to schoolwork, positive emotions between peers may also lead to cynicism and negative emotional experiences towards school work (Ulmanen et al., 2016). Thus, the impact of positive emotions on academic achievement depends on the peer groups' values and interests. If the pupils' peer group does not value and support high achievement in classroom, pupils might choose peer inclusion instead of higher grades. Moreover, increased anxiety caused by competition for good grades may also result from positive peer interactions in which good academic performance is socially expected and valued (Pekrun et al., 2017).

Previous literature on academic emotions at school has mainly focused on exploring emotions experienced during teaching and learning in classrooms. However, during a normal school day, pupils spend a significant amount of time outside the formal learning environment: in a playground, in hallways or in the lunchroom. During this time, pupils interact with teachers, but especially with their peers. Thus, the recess provides an informal arena for interaction within school. This is typically defined as 'non-curriculum time allocated by schools between lessons for children to engage in leisure activities' (Ridgers, Stratton, & Fairclough, 2006). For pupils' emotional experiences, recess has an important role, especially regarding socially embedded emotions. Accordingly, the study by Veenstra and others (2014) showed that negative emotional experiences among pupils typically take space out of teachers' sight, which commonly means recess. As emotions have been shown to last for longer periods of time and transfer from one context to another, one could argue that emotions aroused during recess might later have an impact on learning during formal study. This may lead to situations in which pupils are extremely wired to learn or, in a worst-case scenario, unable to focus on study and learning. However, this seems to be an almost unexplored area of research. An exception to this is a study conducted by Becker and her colleagues (2014), who found out that the moods pupils experience before class were related to both teachers' and pupils' emotions and instructional behaviour during the lesson. These findings imply that the emotions pupils experience while

having fun with friends or arguing with their peers, may have substantial influence on their learning in classroom. Still, the informal learning environment has been highly neglected in the literature on academic emotions.

1.7 Summary of the theoretical framework

Based on the theoretical framework, this doctoral dissertation seeks to provide new understanding on the dynamic nature of academic emotions, especially focusing on their social embeddedness. To reach this aim, the focus was on two active learner groups: student teachers and comprehensive school pupils. Both represent active learners and are connected by the same context, the comprehensive school. Student teachers, future teaching professionals, already need the ability to identify, express and regulate their own emotions during teacher education, as these skills are likely to follow them into their future work and have an impact on their own teaching and wellbeing. Pupils' academic emotions, on the other hand, have an impact on their achievement, motivation and effective use of learning methods. Furthermore, pupils' academic emotions, are likely to have an impact on their teachers' and peers' emotional experiences and vice versa, through social interactions that create, influence, shape and transfer academic emotions. Thus, both groups of learners, student teachers and pupils, need to learn how to identify, regulate and intensify their own emotional expressions to correspond to the learning situation, social encounter or task at hand.

Using the theoretical perspectives presented in previous sections, three main definitions are included to describe the emotions of student teachers and pupils: *emotions*, *academic emotions* and *socially embedded academic emotions* (illustrated in Figure 1). Here, *emotions* are understood as being episode-like, active states that arise from a specific eliciting stimulus with a specific object of activity. Emotions are seen to have two basic dimensions: *valence* (positive vs. negative) and *arousal* (activating/neutral/deactivating) (Barrett & Russell, 1998; Kleine, Goetz, Pekrun, & Hall, 2005). Furthermore, they are seen as being highly situational constructs that get their shape and form from social interactions. Emotions are also seen to have a way to form emotional patterns from multiple different emotional states that are aroused in the same situation, with the same object of the activity.

Academic emotions, on the other hand, are *emotions* that are situated in educational contexts. Previous literature on emotion has delimited academic emotions to involve only emotions that are relating to active processes of studying, teaching, and learning (e.g. Pekrun et al., 2002). In this doctoral dissertation, however, the aim is to expand the earlier definition to include all emotions that are experienced *while engaging in different pedagogical practices or described in relation to pedagogically orchestrated environments*. Here, learners' emotions that are situated

outside formal learning and teaching are considered to be part of the spectrum of academic emotions.

Finally, *socially embedded academic emotions* include all *academic emotions* that are embedded in social interactions between two or more people and located in educational settings. In this doctoral dissertation a different view of the concept of social emotions has been adopted. The traditional view has defined the social emotions in terms of their developmental history, whereas in this dissertation, all emotions situated in pedagogically-orchestrated environments and in the social interaction between people have been defined as *socially embedded academic emotions*.

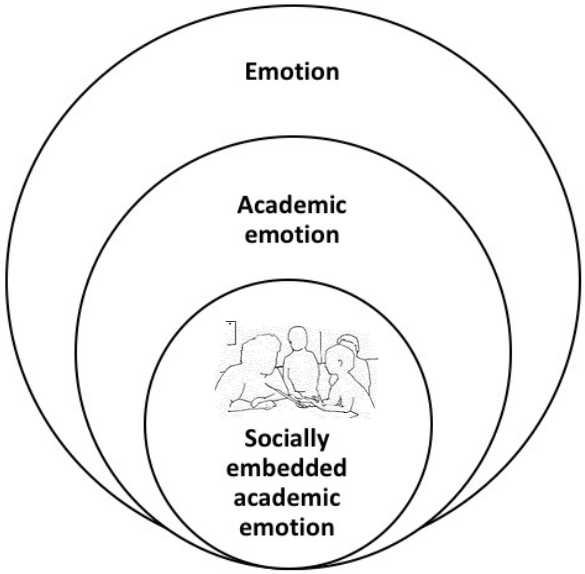


Figure 1. Representation of the main definitions of this doctoral dissertation and their relationship to each other

Accordingly, educational settings are filled with a range of practices and interactions, as are the academic emotions embedded in them. The theoretical framework of this doctoral dissertation has stated the importance of academic emotions for learning. They not only regulate learning but are also by-products of the learning processes. Thus, it is highly important to get diagnostic information about the spectrum of learners' emotions in educational settings, how these emotions are patterned, what triggers the emotional patterns, and how they are embedded in the social interactions of educational settings and different learning environments. Finding answers to these questions and identifying the invariant and contextual elements of learners' academic emotions would help the development of emotionally optimal learning environments at comprehensive school and in the teacher education. Understanding the function of emotions in an educational setting may

also help the learners to take an active role in the process of constructing emotionally optimal environments for themselves, but for their peer learners as well.

2 THE AIM OF THE STUDY

The overall aim of this doctoral dissertation is to understand the dynamic nature of academic emotions, especially in the socially embedded situations of two cohorts of learners: pupils who are learning *at* the school and student teachers that are learning *for* the school. Furthermore, in this doctoral dissertation, new insights on the invariant and contextual elements of the academic emotions of these active learners are being sought.

Accordingly, the following research questions contributing to the understanding of academic emotions and their socially embedded nature in these contexts were addressed:

1. What academic emotions can be identified in the pedagogical situations perceived by student teachers during the teacher education?
2. What emotional patterns and their triggers will student teachers go through during teacher education?
3. What socially embedded academic emotions do pupils report in different learning environments and interactions of school?
4. How are the socially embedded academic emotions perceived by the pupils intertwined with the wellbeing and learning outcomes they experience?

Study I addressed research question 1 and *Study II* research question 2. Research questions 3 and 4 were explored in *Study III*. Student teachers' academic emotions were explored by analysing the emotional landscape of student teachers during their studies in the range of activities provided by teacher education (*Study I*) and by investigating student teachers' emotional patterns and their triggers (*Study II*). Pupils' socially embedded emotions in teacher-pupil and in peer interactions in different learning environments of comprehensive school were investigated in *Study III*.

This doctoral dissertation is part of a larger national research project: 'Learning pedagogical wellbeing and agency in comprehensive school' (see more detailed information in Soini, Pyhältö, & Pietarinen, 2010).

3 TEACHER EDUCATION AND COMPREHENSIVE SCHOOL IN FINLAND

In Finland, comprehensive school teachers are highly educated. Primary school teachers must have a master's degree with a major in educational science or educational psychology (Niemi, 2012) and teacher education is very popular at Finnish universities. Only eight per cent of applicants are admitted to the educational program at the University of Helsinki each year (University of Helsinki, 2017). The curriculum of the teacher education program (300 ECTS – European Credit Transfer and Accumulation System) comprises orientation and communication studies (25 credits), major studies in education/educational psychology (140 credits), multidisciplinary studies in all subjects taught at primary school (grades 1−6) (60 credits), and minor and other complementary studies (75 credits). The minor studies are commonly a larger study module in: a) one of the school subjects, b) pre-school and elementary education or c) special education. The main subject studies include courses in the cultural, psychological and pedagogical bases of education (50 credits) and research studies (70 credits, including courses in research methods, bachelor's and master's thesis) and three mandatory teaching practice periods (20 credits). At the University of Helsinki, the teaching practice periods are organised in practice schools or field schools. Over the last decade, the Finnish teacher education has become increasingly research-focused and today it is built on highly research-based teaching, in terms of the content, pedagogical practice and conducting research. Furthermore, student teachers have the opportunity to practise decision-making, justification and argumentation skills during their teacher studies (Krokfors, Kynäslahti, Stenberg, Toom, Maaranen Jyrhämä, Byman, & Kansanen, 2011). The target time for completing a master's degree in educational sciences is five years, and the education is funded by the state, as are all university degrees in Finland.

In Finland, children typically start their school career at the age of six with pre-primary school, which has been obligatory since 2015. After one year in a pre-primary school, they undertake basic education from the age of seven. The comprehensive school includes the primary school (grades 1–6) and secondary school (grades 7–9) and nearly all children complete the nine years of compulsory basic education. In the primary grades, teachers usually have their own class or group to whom they teach the majority of subjects in the curriculum, with the exception of foreign languages. In secondary school, however, pupils are taught by specialised subject teachers with a master's-level qualification in the taught subject. Furthermore, the teachers are responsible for the assessment of the pupils on the basis of the objectives of the national curriculum. Hence, there are no national tests or ability tracking in Finnish basic education (Kumpulainen & Lankinen, 2012).

Schools do not select their pupils and a place in a nearby school is arranged for each pupil. Thus, children commonly attend the closest school in their neighbourhood. However, parents have the opportunity to choose the school of their preference, with some restrictions. In Finland, the primary aim of the education system is to provide all children with equal access to education and therefore the basic education is publicly funded (Finnish National Agency for Education, 2017; Halinen & Järvinen, 2008). This also includes the learning materials, daily school meals, and health services, such as dental care.

4 RESEARCH METHODS

4.1 Mixed methods

A mixed methods approach was applied in this doctoral dissertation (e.g. Creswell & Plano Clark, 2018; Johnson, Onwuegbuzie, & Turner, 2007) by combining both qualitative and quantitative methods in the data collection and analysis. Mixed methods research involves integrating ideas from both qualitative and quantitative approaches (Johnson et al., 2007) that are seen as being equally valuable and significant (Johnson & Onwuegbuzie, 2004).

In this dissertation, the first two sub-studies can be regarded as being more qualitatively driven, combining different, between method, analysis techniques (*Study I* and *II*) and the third as a more purely mixed methods study (*III*). However, both qualitative and quantitative approaches have been combined in all three sub-studies to a different extent. In *Studies I* and *II*, the research design was qualitative, but in the data analysis, the results of the qualitative content analysis utilised quantification of the qualitatively constructed categories (Krippendorf, 1980), representing the idea of conversion mixed methods design (Onwuegbuzie & Johnson, 2006). The quantification was carried through by calculating the frequency that the category appeared in the data and then by using quantitative analysis methods such as cross tabulation and the χ^2 test (*Study I)*. In contrast, *Study III* combined two datasets, qualitative and quantitative. The qualitative data were used as a preliminary data that was analysed first and then combined with the second, quantitative, dataset. Based on the qualitative study, quantified results were included in the quantitative dataset and analysis. Thus, *Study III* and the doctoral dissertation as a whole represent a sequential exploratory mixed methods design (Creswell & Plano Clark, 2018). This made it possible to reach a more comprehensive understanding of academic emotions in different learning environments and increased the credibility and integrity of the findings by combining both qualitative and quantitative methods (Bryman, 2006; Greene, Caracelli, & Graham, 1989).

Finally, the doctoral dissertation combined the results and research methods of all sub-studies, and thus it represents a pragmatist view that highlights the selection of different methods to answer the research questions in the best possible way (e.g. Creswell & Plano Clark, 2018; Johnson et al., 2007). Thus, the research questions determined the methodological choices of each sub-study (e.g. Creswell & Plano Clark, 2018; Johnson et al., 2007; Teddlie & Tashakkori, 2003).

4.2 Participants

The participants in this dissertation consisted of two cohorts of participants: a) *student teachers* from the University of Helsinki and b) primary and secondary school *pupils* from case-schools around Finland.

The student teacher cohort included 19 primary school student teachers who were majoring in educational science and finishing their studies at the University of Helsinki (female: 14, male: 5; age: mean = 31, mode = 32, median = 29.5, min/max = 23/51 years). The student teachers were selected to this study according to the following criteria: 1) the self-estimated time of graduation was within one year i.e. they all had extensive experience in teacher education, 2) their professional interest was to work in a primary school after graduation, i.e. they were motivated to work as teachers, and 3) their major subject was education (see Ahonen, Pyhältö, Pietarinen, & Soini, 2015). Student teachers differed from each other in terms of their prior teaching and study experience. Some of them had already undertaken other courses before entering a teacher education program, while others entered the program straight from upper secondary school. In terms of the age and gender, the sample sufficiently represented the entire population of primary school student teachers at the University of Helsinki (Statistics Finland, 2011). The participants were informed about the purpose of the study before data collection. Participation for the study was voluntary and permission to undertake the research was granted by the Faculty of Behavioural Sciences. The data collected from the student teachers were utilised in *Studies I* and *II*.

The pupil cohort included 146 sixth and eighth graders (sixth graders: 73, eighth graders: 73, girls: 80 (54.8 per cent), boys: 66 (42.5 per cent)) from three comprehensive case schools around Finland. The schools selected for this study represented typical suburban schools in Finland. Two of the schools contained both primary (1–6) and secondary (7–9) grades, whereas one of them was purely a primary school. The pupil population of the schools varied from 345 to 650 pupils. For this study, sixth graders (age 12–13) and eighth graders (age 14–15) were selected, due to the primary-lower secondary school transition. The eighth graders had recently undergone the transition, whereas the sixth graders were approaching it. Furthermore, there are some differences between the primary and secondary schools in terms of how the school days and subject teaching are organised. In primary school, the teacher is responsible for teaching most of the subjects in the curriculum, compared to the secondary school at which specialised subject teachers teach a great number of subjects and pupils typically have more freedom of choice in their studies. Also, the complexity of the social and pedagogical environment tends to increase in the secondary school (Sahlberg, 2011). Consent to participate in the study was received from the chief officers of the school district, the case schools, the pupils and their parents. The data collected from primary and secondary school pupils were utilised in *Study III*.

4.3 Materials

In this doctoral dissertation, three methods were exploited in data collection. *Interviews, picture tasks* and *survey* were conducted to capture data on student teachers' and pupils' academic emotions in socially embedded learning environments.

Interview. To capture the student teachers' academic emotions, semi-structured interviews were conducted (e.g. Kvale, 1996; 2007) in spring term 2011. To seek participants who were in the final stages of their teacher studies and to recruit them for the interviews, 11 study groups were visited (generally master's seminars). The loose structure of semi-structured interviews made it possible to capture the student teachers' own voice and emotionally loaded descriptions of their study paths (e.g. Kvale, 1996; 2007). The aim of the interviews was to gain information on students' learning and studying in teacher education as well as their perceptions about their future work as a teacher at school. The interviews attempted to capture students' experiences and give time and space for their own voices (e.g. Kvale, 2007). The interview was based on the Student Teacher's Study and Professional Landscape inventory (Ahonen et al., 2015; Soini et al., 2010). The interview contained 20 questions, including 16 questions about studying in the teacher education program and a teacher's role at school, and four questions about the participants' personal and professional backgrounds (see Appendix A). Retrospective narration (Connelly & Clandinin, 2006; Webster & Mertova, 2007; Xu & Connelly, 2010) and visualisation methods (Iantaffi, 2012; Kress & Leeuwen, 1990) were utilised in the interviews to achieve more versatility and depth in the data. To help the retrospective reminiscence of their academic emotions, student teachers were asked to draw a visualisation (Iantaffi, 2012; Kress & Leeuwen, 1990) of their study path to become a teacher. They drew their paths as they saw them, some as timelines, and others as winding roads or maps. A visualisation was applied to promote student teachers' reflection on emotionally loaded experiences during their teaching studies: positively loaded inspiring experiences as well as negative challenging events (e.g. Angelides, 2001; Tripp, 1993; Woods, 1993). During the interviews, the visualisations were used as a practical tool for supporting participants to recall, structure and reflect knowledge that may be difficult to verbalise (Iantaffi, 2012; Kress & Leeuwen, 1990). Furthermore, based on the guidelines of the retrospective narrative inquiry, the interviews were built so that they gave time for the participants to recall their experiences (Webster & Mertova, 2007). The interviews were also created to foster a safe and supportive relationship, that was extremely important for the participants to share their emotional experiences from their study path without being overwhelmed by them (Day & Harris, 2016). Each interview lasted between 60 and 120 minutes. The interviews were digitally recorded and transcribed by members of the research group or trained research assistants. The interview data were utilised in *Studies I* and *II*.

Picture task. In order to capture pupils' socially embedded academic emotions in formal and informal learning environments, a picture task method was utilised in the data collection. The strength of picture task method (e.g. Catterall & Ibbotsin, 2000; Porr, Mayan, Graffigna, Wall, & Vieira, 2011) is that it gives a unique opportunity to examine pupils' emotional interaction episodes both during and between lessons. The picture tasks were collected during spring term 2011. They were constructed from an authentic set of photographs that represented normal school day events in formal and informal school environments that every pupil faces during a normal school day (see Appendix B). Before data collection, the instrument was ecologically validated by pupils, i.e. they recognised the situation represented in the photographs as typical school events. Based on the feedback from pilot studies, a graphic designer drew the final pictures according to neutral everyday school situations. The picture task technique was used to capture pupils' unfiltered perceptions and emotions using visual stimuli and imagery (Branthwaite, 2002; Porr et al., 2011; Ulmanen et al., 2015). Moreover, pupils used their own past experiences and their current motivation to interpret the pictures (Porr et al., 2011). Completing the task took from 15 to 45 minutes, depending from the pupil. The picture task instrument is explained in more detail in Appendix B. The picture task data was utilised in *Study III.*

Survey. The data were collected by using a survey intended to measure comprehensive school pupils' experienced emotional and cognitive engagement and pupils' wellbeing in school (Pietarinen et al., 2010; Ulmanen et al., 2016). The questionnaire was based on the results of a qualitative analysis of ninth graders' positive and negative school experiences (Pyhältö, Soini, & Pietarinen, 2010). In this doctoral dissertation the survey was utilised to explore the relationship between socially embedded academic emotions and cynicism and thriving at school. Thus, items measuring cynicism and perceived satisfaction in school were employed (see Appendix C). The cynicism scale consisted of five items that indicated pupils' school-related cynicism. The positive wellbeing indicator, perceived satisfaction in school, was measured with one *thriving at school* item. All items were rated on a 5-point Likert scale (*1 strongly disagree – 5 strongly agree*), except the thriving at school item, which was rated on a 10-point scale. Pupils' background variables, gender, school grade and age were gathered. Moreover, the *school achievement* was measured with *school grade point average*, on a scale from 4 to 10 (4 being fail and 10 being excellent) gathered from the school records in the 2011 spring term. The survey was conducted during a school day in spring term 2011 and pupils were given both oral and written instructions. Pupils had 15–20 minutes to complete the survey. The survey data were utilised in *Study III*.

Interview, picture task and *survey*. Before the data collection, all the instruments were validated by the members of the research group. Moreover, pilot studies were carried out before actual data collections, and the final data instruments were further developed according to feedback from the pilot studies.

4.4 Analysis

To explore the dynamics of student teachers' and pupils' academic emotions and their social embeddedness, both qualitative and quantitative analysis procedures were utilised (e.g. Creswell & Plano Clark, 2018; Johnson et al., 2007). In this study the primary analysis was qualitative, followed by quantitative methods. The qualitative analysis widened the understanding of the academic emotions of two groups of learners, whereas in the quantitative analysis, the phenomenon was explored in more in depth by quantifying the qualitative results and combining quantitative analysis procedures.

4.4.1 Student teacher Interviews (Study I and II)

To achieve an optimal understanding of the phenomenon, the student teacher interviews (*Study I* & *II*) were qualitatively content analysed (e.g. Drisco & Maschi, 2015; Elo & Kyngäs, 2007; Patton, 1990) using an abductive strategy (e.g. Chamberlain, 2006; Coffey & Atkinson, 1996; Haig, 2005; Levin-Rozalis, 2004; Morgan, 2007; Timmermans & Tavory, 2012). The aim of the abductive strategy was to combine theory-driven (deductive) and data-oriented (inductive) approaches. Abduction is a process through which the theoretical understanding based on prior studies is linked together with the themes identified in the data, maintaining a dialogue between them. Thus, it is compatible with the idea of a hermeneutic circle (Morgan, 2007). Accordingly, distinct phases of the content analysis represent more purely ether inductive or deductive approaches.

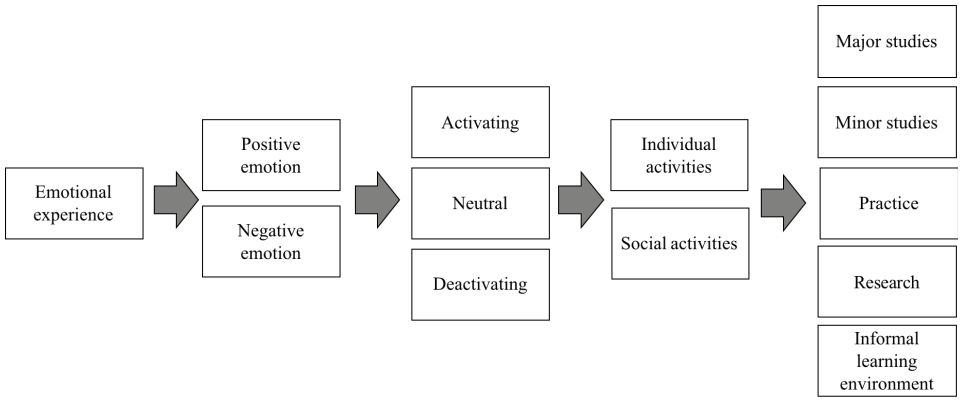


Figure 2. Visualisation of the analysis process in *Study I*

Study I. To gain a better understanding of student teachers' academic emotions, the analysis focused on exploring students' emotional experiences. The analytical process included five complementary phases that are visualised in Figure 2. At first, all the text segments in which the students described emotional experiences

relating to their studies were classified into the same category. In the second phase, the valence of the emotional experience was then coded into two mutually exclusive categories: 1) positive emotions and 2) negative emotions. In the third phase, the arousal of the emotional experience was analysed in terms of whether the emotion reported was activating, neutral or deactivating. Phases 2 and 3 started out empirically grounded but moved towards more theory-driven analysis guided by the valence-arousal framework by Pekrun et al. (2002) (Braun & Clarke, 2006). In the fourth phase, to understand the social embeddedness of student teachers' emotions, the emotional experiences were coded into two categories: 1) Individual activities and 2) Social activities. Finally, to identify the activities in which the emotions were embedded, the context of the emotion was categorised according to the primary activities of teacher education as follows: 1) major studies, 2) minor studies, 3) practice, 4) research, and 5) informal learning environment.

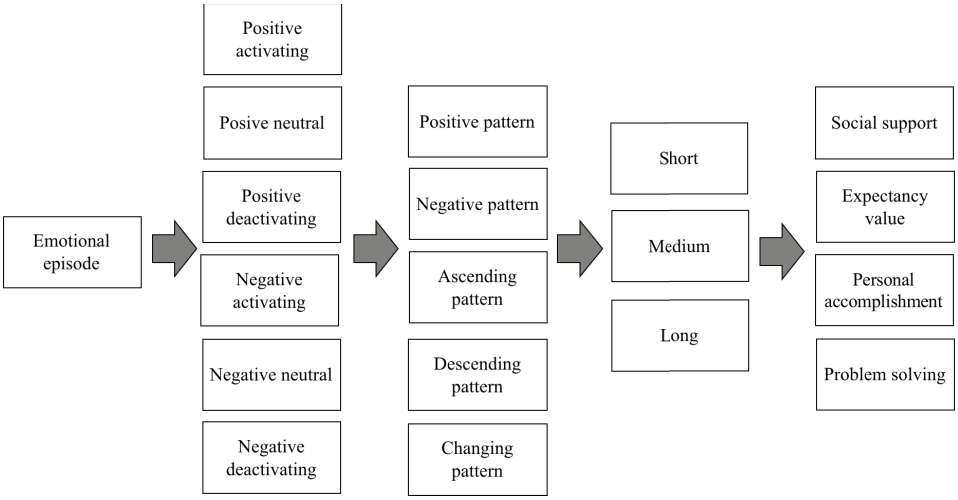


Figure 3. Visualisation of the analysis process in *Study II*

Study II. The analysis focused on identifying student teachers' emotional patterns experienced in emotionally loaded episodes. The analysis included five phases. A visualisation of the phases is provided in Figure 3. In the first phase, all the emotionally loaded episodes (in which the student teachers explained a minimum of two emotions that had a same object of activity), were coded into the same category. In the second phase, to understand the nature of the emotions, the valence and the arousal of the emotion was categorised based on the valence-arousal framework of Pekrun et al. (2002), resulting in six categories: 1) positive activating emotions, 2) positive neutral emotions, 3) positive deactivating emotions, 4) negative activating emotions, 5) negative neutral emotions, and 6) negative deactivating emotions. In the third phase, the emotional patterns within the episodes

were formed to identify how different emotions relate to each other, resulting in five categories: 1) positive pattern, 2) negative pattern, 3) ascending pattern, 4) descending pattern, and 5) changing pattern. In the fourth phase of the analysis, to identify the duration of the patterns, the categories were formed as follows: 1) short pattern, 2) medium length pattern, and 3) long pattern. Finally, to identify the triggers that initiate the patterns, the primary trigger for the emotional patterns was analysed, resulting in four categories: 1) social support, 2) expectancy value, 3) personal accomplishment, and 4) problem solving. An example of an emotional episode and how it was coded can be found in Appendix D.

In *Studies I* and *II*, the qualitative categories derived from the analyses were assessed by the research group at the end of each analytical phase, to enhance the credibility and trustworthiness of the analyses and the results (Miles & Huberman, 1994). Furthermore, in *Studies I* and *II* an independent parallel analysis was carried out. The categories resulting from the qualitative analyses in *Studies I* and *II* were quantified by recording the frequency the category appeared in the data. In *Study I,* the interrelation between the valence of student teachers' emotions and the level of activation of the emotions and the social aspect of the activity was analysed by using cross tabulation and the χ^2 test.

4.4.2 Pupil picture task and survey (Study III)

To gain an understanding of pupils' socially embedded academic emotions, teacher-pupil and peer interactions situated in formal and informal learning environments of comprehensive school were focused on, and both qualitative and quantitative procedure were combined in the analysis. In the first phase of the analysis (visualised in Figure 4), the pupils' answers to the picture tasks were qualitatively content analysed (e.g. Drisco & Maschi, 2015; Patton, 1990) using abductive strategy (e.g. Chamberlain, 2006; Coffey & Atkinson, 1996; Haig, 2005; Levin-Rozalis, 2004; Morgan, 2007). The content analysis included three phases. In the first phase, all emotionally loaded social episodes were identified. In the second phase, to identify the direction of the interaction, the emotionally loaded social episodes were categorised into two qualitatively distinct categories: 1) teacher-pupil interaction and 2) peer interaction. In the third phase of the analysis, to understand the emotional tone of the social interaction, the valence was analysed: 1) positive emotions and 2) negative emotions.

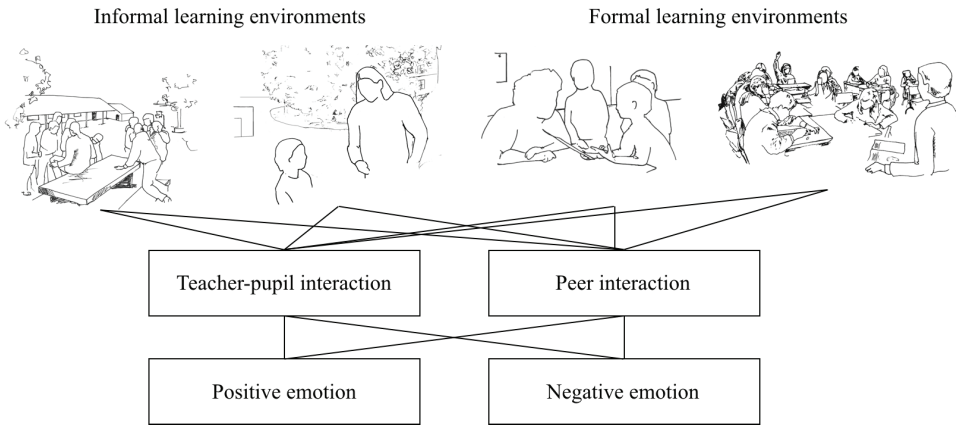


Figure 4. Visualisation of the qualitative analysis process part 1 of *Study III*

After the content analysis, an emotional index for both peer interaction and teacher-pupil interaction, was calculated for each pupil, resulting in four categories: 1) positive peer interaction, 2) negative peer interaction, 3) positive teacher-pupil interaction, and 4) negative teacher pupil-interaction (visualised in Figure 5). Frequencies for these categories were calculated. The quantified results of the qualitative study were then included to the quantitative analysis, the aim of which was to explore the association between pupils' emotions and their GPA, thriving at school, school grade, and school related cynicism. Independent samples T-test was carried out to measure the association between emotional indexes, cynicism, GPA, and thriving at school. In addition, a χ^2 test was carried out to test the difference between sixth and eighth graders' emotion indexes. To improve the validity and reliability of the analysis and the results, the categories from the content analysis were assessed by the research group at the end of each phase of the analysis and finally an independent parallel analysis was carried out (Miles & Huberman, 1994).

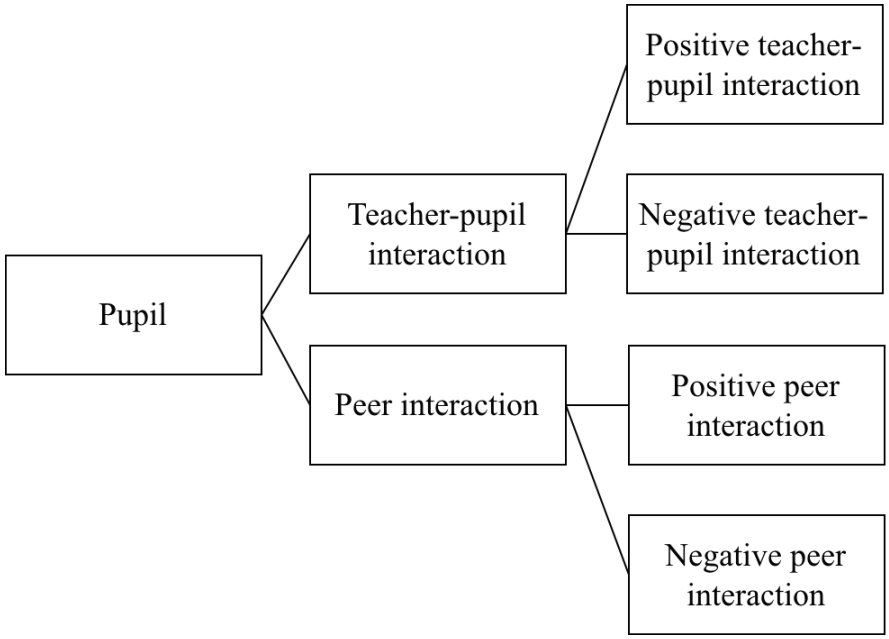


Figure 5. Visualisation of the qualitative analysis process part 2 of *Study III*

4.5 Summary of the methods

The aim of this doctoral study is to understand student teachers' and comprehensive school pupils' academic emotions by utilising a mixed methods approach, combining both qualitative and quantitative research methods (e.g. Creswell & Plano Clark, 2018; Johnson & Onwuegbuzie, 2004; Johnson et al., 2007). Accordingly, the study reported in this dissertation was carried out by collecting data through interviews, picture tasks and surveys, and analysing the data using qualitative content analysis (e.g. Drisco & Maschi, 2015; Patton, 1990) and statistical procedures. Table 1 presents an overview of the research aims, participants, methods, instruments and procedures that were used in *Studies I, II* and *III*.

Table 1. Overview of the study methods and procedures

Study	General aim	Participants	Method	Instrument	Analysis	Research question
Study I	To explore the spectrum of student teachers' academic emotions embedded in different activities provided by their educational program	19 primary school student teachers	Interview	- A semi-structured interview examining the student teachers' emotional experiences during teacher education (see Appendix A)	- Qualitative, abductive content analysis - Quantification of qualitative data - Cross-tabulation and χ 2 test	1
Study II	To enhance the understanding of student teachers' academic emotions by exploring emotional patterns and their triggers in emotionally loaded episodes	19 primary school student teachers	Interview	- A semi-structured interview examining the student teachers' emotional experiences during teacher education (see Appendix A)	- Qualitative, abductive content analysis - Quantification of qualitative data	2
Study III	To understand pupils' socially embedded emotions in formal and informal school environments, in both teacher-pupil and peer interactions	146 sixth and eighth graders	Picture task, Survey	- Picture task (see Appendix B) - An item measuring perceived satisfaction in school (see appendix C) -A scale measuring pupils' school-related cynicism (see Appendix C) - Background variables - GPA	- Qualitative, abductive content analysis of the picture tasks - Quantification of qualitative data - Independent samples T-test and cross-tabulation	3,4

5 RESULTS

In the following sections, the core results of the three sub-studies are presented according to the research questions, starting from the student teachers' emotional experiences in teacher education followed by the socially embedded emotions reported by pupils in comprehensive school. The results are reported in more detail in the original journal articles.

5.1 The anatomy of student teachers' academic emotions

The results showed that student teachers experience many academic emotions during their studies, which gave life to their journey to become a professional teacher. A total of 793 emotional experiences were detected, including 18 positive and 20 negative emotions (see Table 2). The emotions student teachers reported ranged from enthusiasm and admiration all the way to frustration and disappointment, showing a wide spectrum of emotional experiences during teacher education. In addition, the valence and the arousal level varied between the academic emotions described.

Table 2. Landscape of student teachers' academic emotions

	Positive emotions (*f*)		**Negative emotions (*f*)**	
Activating	Enthusiasm (135) Interest (66) Enjoyment (52) Admiration (40) Hope (39)	Adequacy (9) Surprise (8) Courage (5) Pride (4) Trust (1)	Frustration (42) Anxiety (26) Fear (15) Irritation (15) Worry (8) Shock (5)	Uncertainty (4) Unfairness (4) Shame (4) Envy (2) Restlessness (1) Hate (1)
Neutral	Satisfaction (74) Belonging (23) Gratitude (6)	Appreciation (5) Happiness (3) Amusement (1)	Harm (18) Sadness (3)	
Deactivating	Relief (6) Longing (4)		Disappointment (59) Inadequacy (59) Misery (19)	Exhaustion (16) Loneliness (7) Boredom (4)

f=frequency

Most of the academic emotions reported by the student teachers were positive. Enthusiasm, interest, satisfaction, enjoyment and admiration were especially emphasised by student teachers. In terms of negative emotions, inadequacy, disappointment and frustration were reported most often. Both positive and negative emotions were typically related to motivational elements. Although the spectrum of the emotions was extensive, some of the emotions, such as trust, amusement, happiness, envy, restlessness, hate, and sadness, were described rarely or even only once and thus were not at the core of student teachers' emotional experiences.

Student teachers most commonly emphasised activating emotions. However, deactivating and neutral emotions such as disappointment, inefficacy and satisfaction were reported rather frequently. Positive emotions were typically activating but negative emotions, on the other hand, were most commonly deactivating. However, activating negative emotions and neutral positive emotions were also often reported, whereas neutral negative emotions and deactivating positive emotions were quite rare.

Student teachers' academic emotions were situated in different activities provided by the teacher education, such as working alone with a study related task, conducting a group work with peer students or during teaching practice in a classroom full of pupils. The results showed that most of the emotions in teacher education were related to individual activities (*f*=482), but social activities were also frequently described as a source of emotions (*f*=311) (see Table 3). There were no differences in the valence of emotions situated in individual and social activities. Accordingly, student teachers expressed more positive emotions and fewer negative emotions in both settings. In more detail, activating positive emotions and deactivating negative emotions were described most frequently in both activities.

Table 3. Valence of the academic emotions in individual and social activities

	Positive emotions (*f*)	Negative emotions (*f*)	Total (*f*)
Individual activities	259	223	482
Social activities	177	134	311
Total	436	357	793

f=frequency

Furthermore, the study showed that student teachers' emotions were embedded in various academic contexts of teacher education (see Figure 6) such as during major-subject studies, complementary minor-subject studies, teaching practice, while conducting research and during informal encounters with other people of the teacher education community. Student teachers' described emotions, both positive and negative, were mainly situated in major studies and teaching practice. These two contexts form the basis for student teachers' learning and professional identity development. Particularly, teaching practice experiences were often heavily emotionally loaded. Student teachers described admiration and frustration caused by their teaching practice supervisors when they received either excellent guidance and support or none of it. Interaction with pupils in teaching practice was also seen as the origin of student teachers' emotions, and particularly positive emotions such as enjoyment and enthusiasm were described in situations in which student teachers witnessed their pupils learning new skills and knowledge. Emotions were

less frequently described related to conducting research, during complementary minor studies and outside formal learning environments such as between lectures and hanging around with fellow students. Furthermore, emotional experiences situated in informal learning environments were typically embedded in social activities.

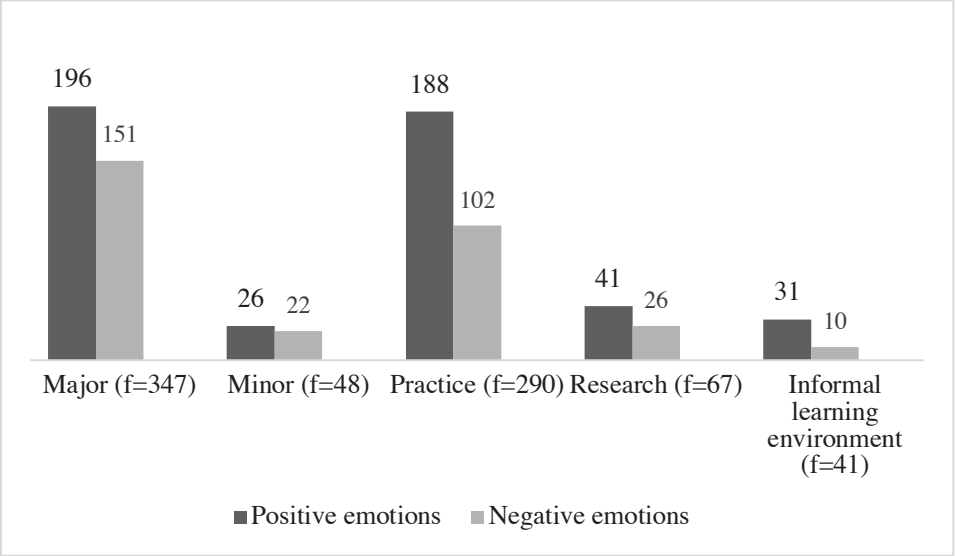


Figure 6. Academic emotions in different activities of teacher education

5.2 Student teachers' emotional patterns

Further investigation showed that student teachers' emotionally loaded episodes constituted from five distinct emotional patterns: positive, negative, ascending, descending and changing patterns. The emotional patterns were composed of 2 to 15 emotions. Figure 7 illustrates the frequencies of the patterns: most of the emotional patterns were positive, followed by a significant number of changing patterns. Ascending, negative and descending patterns were less frequently detected.

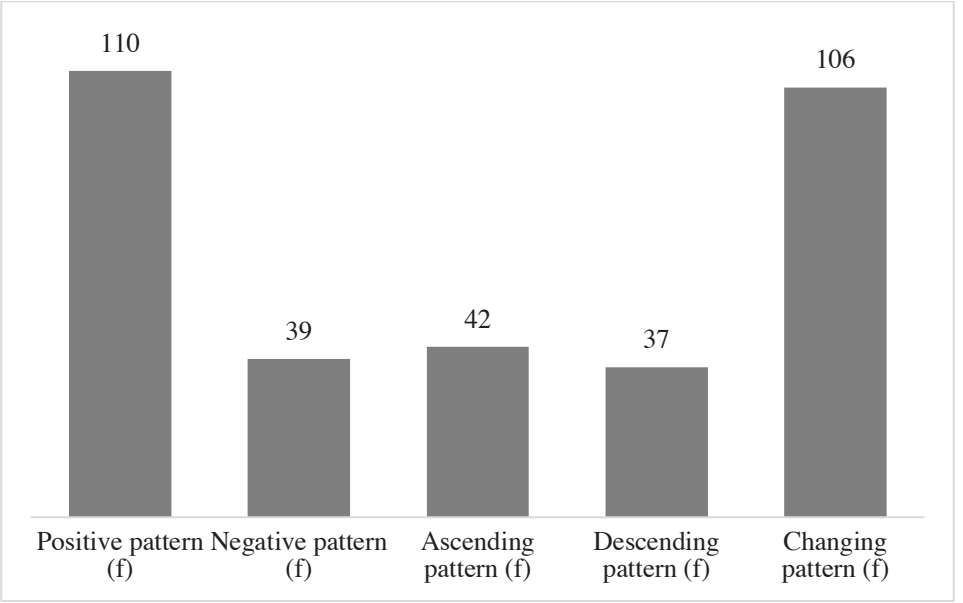


Figure 7. Student teachers' emotional patterns and their frequencies

Positive patterns included only positive emotions. Especially activating emotions with a highly motivational tone, such as enthusiasm and interest, were typically detected among the positive patterns. Experiences of study success, overall professional development and learning new skills and knowledge contributed to student teachers' positive emotional patterns. Furthermore, supportive interaction between fellow student teachers and teacher educators, in both the university and the training schools, were described as a source of positively loaded patterns.

Student teachers also experienced negative emotional patterns including only emotions with a negative valence. In particular, experiences of inadequacy, disappointment, frustration, boredom and exhaustion were typically described. Contradictory to the positive patterns, here the activation level varied heavily between activating and deactivating through the patterns. Still, they were highly (on-)task related. For instance, disengagement from learning, losing interest in the studies and lack of support from teacher educators seemed to lead to negatively loaded emotional patterns.

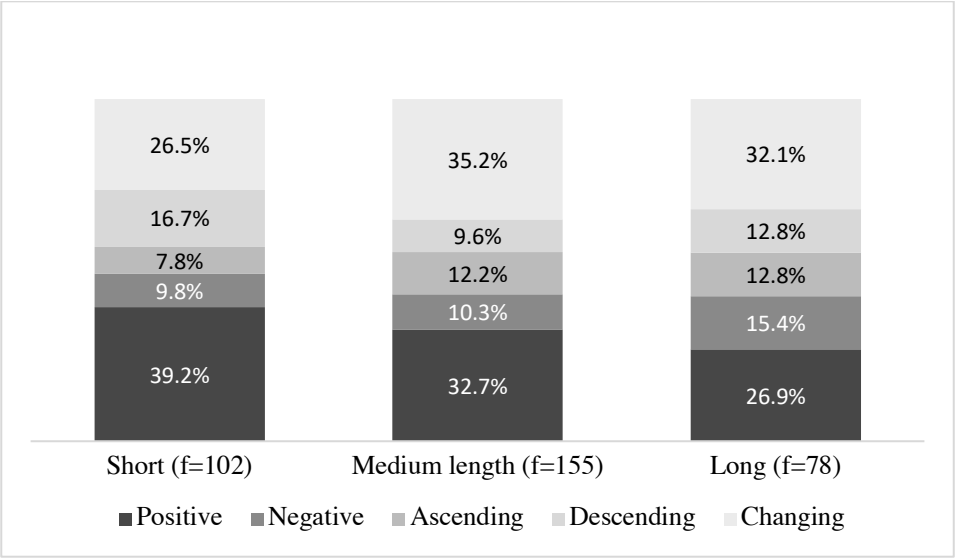
A common characteristic of both positive and negative patterns was that the valence stayed the same throughout the patterns. In the ascending patterns, emotions changed from negative to positive during the emotional episode. Ascending patterns commonly entailed friction between a challenge provided by the task and student teachers' own estimated abilities. Student teachers were either overwhelmed by the task or saw it as a rather meaningless situation in which the challenge and their own abilities were not aligned. This typically elicited negative emotions. However, overcoming the challenges by hard work (for example), was

shown to increase student teachers' self-efficacy and resilience that further led to positive emotions and to an ascending pattern.

A descending pattern, on the other hand, was shown to result from unsolved friction in the dynamics of the learning environment. Characteristic of this pattern was that it started with positive emotions, but these turned into negative emotional experiences towards the end of the episode. A particular mismatch between student teachers' high expectations regarding teacher educators' effort put into their courses and their fellow students' contribution to group work typically led to a descending pattern in situations in which the expectations were not met. Furthermore, if the task was seen as being too easy compared to the level of skills and knowledge, student teachers typically described descending patterns.

Finally, the results showed a changing pattern, when the emotions fluctuated back and forth between the positive and negative valence. As opposed to other emotional patterns, changing pattern contained a great deal of variation, both in terms of valence of the emotions but also regarding the object of the patterns. In some of the patterns the valence changed repeatedly, whereas in others, the valence fluctuated only once back and forth. Changing patterns included all characteristics that the other patterns had. Changing pattern, for example, imitated ascending patterns in which task was first seen as being too difficult, arousing negative emotions that turned positive with teacher educators support, but in the end reverted to negative when the outcome was not satisfactory.

The results further showed that the duration of the emotional patterns varied from short encounters between peers to medium-length periods of courses, to even longer periods of time such as a whole academic year. Medium length patterns were most typical, but short and long periods were also identified frequently (see Figure 8). The duration of the emotional patterns, however, did not change the profile of the patterns, and similar emotional patterns were identified in all timescales and furthermore, were evenly distributed.



f=frequency, %= per cent

Figure 8. Duration of the emotional patterns

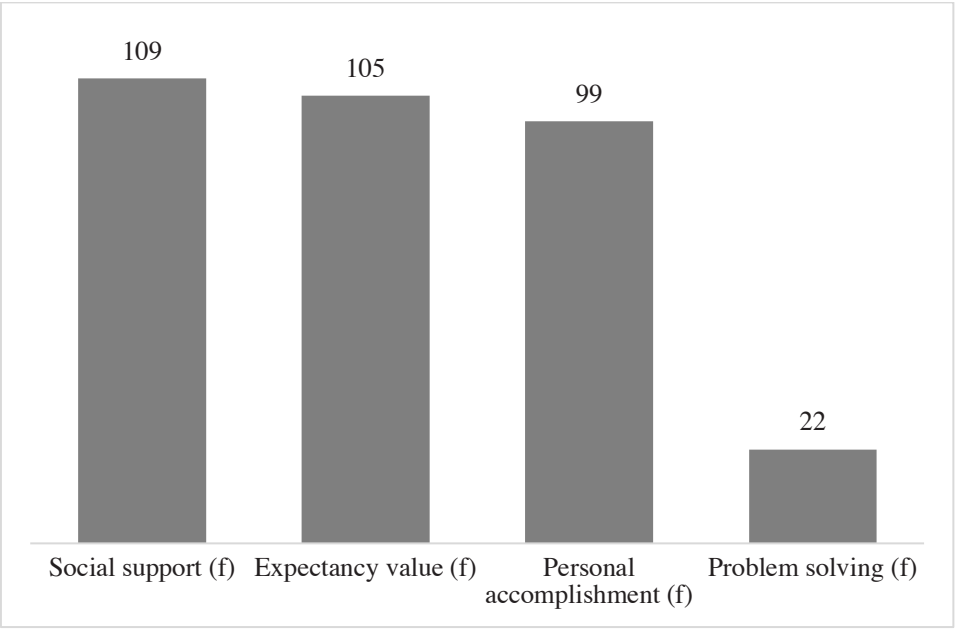
Student teachers' emotional patterns were triggered by several factors (see Figure 9). Four triggers were identified: social support, expectancy value, personal accomplishment and problem-solving. Receiving or not receiving social support from fellow student teachers and teacher educators was identified as the most common trigger for student teachers' emotional patterns. In situations in which student teachers received help and emotional support or saw teacher educators as being keen to give informational support triggered positive or ascending patterns. On the other hand, student teachers also described destructive cohesion among other student teachers, unhelpful teacher educators and missing emotional support in challenging situations. Lack of social support typically triggered either negative emotional patterns or turned the pattern negative at the end of the pattern.

Almost as frequently, fulfilled and unfulfilled expectations in terms of the content of a course or investment of teacher educator in their teaching, triggered emotional patterns in student teachers. The expectations were commonly related to teacher education in general, specific courses, single lectures, teaching practice, peer students and teacher educators in training schools and at university. Student teachers commonly expected to receive quality teaching that fosters their development process. They expected to be attending insightful lectures from inspiring teacher educators, who would be happy to share their knowledge and give support to the students. Furthermore, student teachers had high expectations regarding cooperation from fellow students in group work and especially in teaching practice, during which they were mutually responsible for teaching certain subjects to the pupils. Student teachers also expected to have good teaching experiences during

their teaching practice, learn to encounter the pupils in classroom, receive important teaching experiences and get confirmation that they had made the right decision about their future career.

A sense of personal accomplishment, or the lack of it, also commonly triggered emotions. Student teachers experienced both inadequacy in terms of their own abilities and study success, followed by the acquisition of new skills and knowledge. Professional development and the process of becoming a teacher were also described, especially during the teaching practice. However, student teachers also reported not finding their teacher identity or their own place in the professional community and considered changing the profession.

Finally, emotions were triggered by resolved and unresolved problems, but only rarely. These emotions were commonly related to the teacher educators, the courses and teacher education in general.



f=frequency

Figure 9. Triggers of the emotional patterns

5.3 Pupils' socially embedded academic emotions

The results showed that comprehensive school pupils recognised school as a central arena for socially embedded academic emotions. Emotions were not only described inside a classroom, during formal learning and studying, but also widely situated outside the formal school settings. Most of the emotions reported by pupils were situated in informal learning environments, during recesses (see Table

4). However, the formal learning environment was also widely recognised as an arena for emotional experiences. Pupils described slightly more negative emotions than positive ones: negative emotions were emphasised, particularly in the informal learning environment, whereas positive emotions were commonly described during formal teaching and learning. Pupils' positive emotions in the social interactions of school, including descriptions of enjoyment, happiness and pride, were related to descriptions of having fun with friends, and getting help and positive feedback from the teacher. Negative emotions, on the other hand, were typically associated with peer bullying or misbehaviour, and being ignored by the teacher. These descriptions entailed emotions such as fear, frustration and anger.

Table 4. Valence of the socially embedded academic emotions in different learning environments

	Positive emotions (*f*)	Negative emotions (*f*)	Total (*f*)
Formal learning environment	131	122	253
Informal learning environment	119	224	343
Total	250	346	596

f=frequency

Emotions reported by pupils were situated in teacher-pupil and peer interactions. Most of the reported emotions were embedded in teacher-pupil interaction, where especially formal learning environment was emphasised (see Table 5). These emotions were commonly related to studying, teaching and learning activities such as pupils doing exercises or taking exams and the teacher teaching in front of the class or asking questions. Most of the classroom-based emotions had a positive valence. Pupils often described positive emotions such as gratitude, satisfaction and happiness in classroom situations when teacher was offering help, giving positive feedback and encouragement. Pupils also acknowledged situations in which a teacher expressed satisfaction towards pupils' learning-oriented behaviour and competence. Both teachers' and pupils' emotions were described, including joy, happiness, satisfaction and pride. Pupils also described a wide range of negative emotions in teacher-pupil relationships during classroom activities. Negative emotions were typically related to situations in which the teacher was disciplining pupils due to their misbehaviour. In these situations, pupils commonly stated that they did not share the teacher's view and saw the rebuke as unfair treatment. For instance, pupils described anger and frustration. Negative activating emotions such as frustration, anxiety and confusion were also frequently described in situations in which the teacher ignored the pupils or they did not receive social support and constructive feedback from their teacher.

Although the formal settings of school constructed the main arena for the emotions described in teacher-pupil interaction, the recess still seemed to be a relevant context for emotional experiences in social encounters between teachers and pupils. Most of the negative emotions during recesses situated in teacher- pupil interactions were associated with the teacher disciplining the pupils, due to either peer bullying or other misbehaviour in the school yard. When pupils did not agree with the teacher, expressions of anger and frustration were often described. Negative emotions in teacher-pupil interactions were also reported in situations in which the teacher chose not to solve pupils' peer related problems or ignored the pupils in some other way. The teacher's emotions were also described, especially worry over pupil's loneliness and poor academic performance. Positive emotions in teacher-pupil interaction during recess were only rarely reported. These emotions were typically related to casual interaction between teacher and pupils, including descriptions of having a laugh together and enjoying each other's company. In addition, pupils impressed positive emotions of relief, hope and satisfaction, if the teacher took their side and addressed the problems in peer relationships.

Table 5. Described socially embedded academic emotions in teacher-pupil interaction

	Positive emotions (*f*)	Negative emotions (*f*)	Total (*f*)
Formal learning environment	99	86	185
Informal learning environment	47	85	132
Total	146	171	317

f=frequency

Although emotions embedded in teacher-pupil interaction were emphasised, peer interactions were also shown to be at the core of school's emotional environment (see Table 6). In terms of peer interactions, recess settings were seen as the main arena for reported emotions. Negative emotions, relating to bullying, peer-rejection and misbehaviour, were especially described. For instance, anxiety, loneliness and sadness were typically reported, but also anger and schadenfreude regarding another pupil's misbehaviour and peer bullying were emphasised. Furthermore, positive emotions were commonly associated with having fun with friends and inclusion in a peer group. Emotional experiences of enjoyment, happiness and belonging were most typically characterised.

The results further showed that pupils' peer related emotions were not emphasised in formal learning environment to the same extend than in recess. Emotions embedded in peer interaction were only seldom reported during the formal classroom activity. Negative emotions were associated with other pupils' misbehaviour or their interest in schoolwork. Emotions, such as anxiety, frustration and anger were typically mentioned. Positive emotions embedded in peer interactions were

seldom described in classroom situations. Pupils reported positive emotions, especially when working together towards a shared goal. Positive emotions were also frequently related to other pupils' school success. For instance, happiness, admiration, proudness and enjoy were commonly described.

Table 6. Described socially embedded academic emotions in peer interaction

	Positive emotions (*f*)	Negative emotions(*f*)	Total (*f*)
Formal learning environment	32	36	68
Informal learning environment	72	139	211
Total	104	175	279

f=frequency

GPA, cynicism, school drive and school grade in a relation to pupils' socially embedded emotions

Further investigation showed that pupils' overall emotional tones in the school's social relationships were most commonly negative (see Table 7) in both peer and teacher-pupil interaction. However, positive overall emotional tones were also frequently detected. Furthermore, the results showed that emphasising negative emotions in teacher-pupil interactions was related to school related cynicism and thriving at school. That is, pupils who attributed more negative emotions related to teacher-pupil interactions were more cynical (t =2.26; df =136; p=.025) and enjoyed going to school less (t = -2.20; df =129; p =.03). However, attributing negative emotions in peer interaction was not directly connected to school-related cynicism (t= .72; df= 131; p= .47) and school satisfaction (t=-1.95; df= 134; p=.05). Moreover, the emotional tone did not differ between the sixth and the eighth graders in either peer (χ^2=.243; df= 1; p=.622) or in teacher-pupil interactions (χ^2=.999; df=1; p= .318). The results further showed that the emotional tone in peer (t= .37; df= 133; p=.97) and in teacher-pupil interactions (t= -1.55; df= 131; p=.12) did not have a connection with their GPA.

Table 7. Descriptive statistics

	Teacher-pupil interaction		Peer interaction		
Positive emotion index	*f*=57		*f*=60		
Negative emotion index	*f*=78		*f*=78		
	Items	Min	Max	Mean	SD
Cynicism	5	1	5	2.28	.862
Thriving at school	1	1	10	7.70	1.66
GPA	1	5.95	9.64	7.90	.878

frequency (*f*), number of items (Items), minimum values (Min), maximum values (Max), mean values (Mean) and standard deviations (SD)

The key findings of student teachers' and pupils' academic emotions and their social embeddedness have been gathered below, in Table 8.

Table 8. Key findings of the results

Key findings of student teachers' emotional landscape	**Key findings of student teachers' emotional patterns**	**Key findings of pupils' socially embedded emotions**
Student teachers' emotional landscape is rich and filled with academic emotions with different valence and activation level. Most of the student teachers' described emotions were positive and most commonly activating. Negative emotions on the other hand were typically deactivating. Most of the positive and negative emotions were related to motivational elements. Academic emotions were more commonly situated in individual activities, but also part of social interactions. Especially negative emotions were related to fellow students and teacher educators Especially practice and major-subject experiences were emotionally flavoured.	Student teachers' emotional experiences during teacher studies were constituted from different kind of emotional patterns. Most of the emotional patterns were positive, filled with experienced enthusiasm and interest. Significant number of changing patterns were also detected. The profile of student teachers' emotional patterns was similar regardless of the duration of the patterns. The triggers of the patterns were highly task-related and tightly connected to the key elements of studying to become a teacher.	The social interactions at school are significant determinants of pupils' emotions. Emotions are widely aroused in both formal and informal settings of school. The role of recess settings is significant in terms of pupils' emotions, especially regarding peer interactions. Emphasising negative emotions in teacher-pupil interaction seems to be related to pupils' cynicism and thriving at school. In peer interaction, the emphasis of negative emotions did not have an impact on cynicism or satisfaction experienced at school.

6 DISCUSSION

6.1 Methodological reflections

6.1.1 General reflections on mixed methods design

In this doctoral dissertation, a mixed methods approach was utilised by exploiting semi-structured interviews, picture tasks and a survey to build a comprehensive understanding of the academic emotions in different learning environments (e.g. Creswell & Plano Clark, 2018; Johnson et al., 2007; Tashakkori & Teddlie, 2003). In practice, both qualitative and quantitative data collection and analysis methods were integrated as a sequential exploratory mixed methods design. The qualitative data and analysis formed the primary dataset and the quantitative methods helped to generate and explain the findings of qualitative analysis even further.

In the first two sub-studies (*Study I* and *II*), the qualitative interview data enabled the student teachers to reflect on their whole study journey and at the same time brought their own voice about the emotional experiences to light. In this, *methodological triangulation* (within method approach) (Patton, 1999; 2002) was utilised by combining qualitative methods (semi-structured interviews, visualisations, retrospective narration) in order to capture a broad view of student teachers' academic emotions and to avoid contradictions and misinterpretations of the data. The results of the qualitative analysis were then further quantified to gather a more comprehensive picture of student teachers' academic emotions. The quantification clarified the qualitative results and further brought new understanding that could be gathered only with quantitative methods (Onwuegbuzie & Johnson, 2006). Furthermore, it brought *conversion legitimation* for the mixing as quantifying the appearances of the academic emotions in the data prevented from over or under weighing the results (Onwuegbuzie & Johnson, 2006; Sandelowski, 2001).

In *Study III*, two datasets and both qualitative and quantitative analysis methods were combined. The picture tasks made it possible to capture pupils' often tacit projections of academic emotions embedded in social interactions of different environments and interactions of school. Furthermore, the survey enabled a deepening of the understanding of socially embedded academic emotions by making it possible to explore the relationship between the emotions and cynicism, school satisfaction, GPA and school grade. The sequential mixed methods design and the timing of the mixing brought more credibility to the results of the qualitative analysis (Creswell & Plano Clark, 2018). Combining qualitative and quantitative methods in both data collection as well as in the analysis process provided a better understanding of academic emotions of two learner cohorts.

In terms of the *inference quality* of this doctoral dissertation*, the design quality* and *the interpretive rigour* (Teddlie & Tashakkori, 2003) need to be assessed. To

strengthen the design quality (i.e. the evaluation of the methodological rigour) academic emotions were explored in three sub-studies and with two cohorts of learners. The first part study focused on the landscape of student teachers' academic emotions and the second one investigated student teachers' emotional patterns and their triggers. Based on the results of the first two sub-studies, the focus shifted from the emotional landscape in teacher education to explore more specifically the socially embeddedness of academic emotions in comprehensive school. Moreover, expanding the doctoral dissertation to involve the different learner cohorts that are connected by the same context provided a more comprehensive understanding of academic emotions in education. Furthermore, different datasets supported the cumulation of the key findings of the sub-studies. Thus, different datasets and participant cohorts supplemented each other and provided information that would have been hard to achieve with only one learner cohort or dataset (Darbyshire, MacDougall, & Schiller, 2005).

Also, *investigator triangulation* was utilised (Archibald, 2016; Denzin, 1970) in the data collection. The instruments of this doctoral dissertation were designed in collaboration with the members of the research group. Before the data collection, pilot studies were carried out. Based on the feedback received from the teachers, pupils, and student teachers, the instruments were further refined. This ensured that the instruments were suitable for teacher education and comprehensive schools and that they produced new insights of academic emotions (Cohen, Manion, & Morrison, 2007). Furthermore, several members of the research group participated in the data collection. By engaging a number of researchers in the data collection process, the researchers' possible influence on pupils and student teachers perceptions was reduced.

In this dissertation, abductive data analysis strategy was carried out, to increase the *interpretive rigour* (Teddlie & Tashakkori, 2002). The abductive strategy made it possible to obtain a continuous interplay between empirical observations and theoretical presumptions (e.g., Coffey & Atkinson, 1996; Levin-Rozalis, 2004; Morgan, 2007), that was employed in validating the interpretation and their trustworthiness (e.g. Kvale, 2007; Miles & Huberman, 1994). Moreover, the *investigator triangulation* also strengthened the interpretive rigour. The discussions between the members of the research group as well as independent parallel analysis of each sub-study, increased the reliability of the study. The overall agreement rate in *Study I* was 92 per cent, in *Study II* 90 per cent and in *Study III* 91.4 per cent. Thus, this indicates that there was sufficient agreement between the coders.

Regarding the *inference transferability*, it must be noted that the student teacher data used in this dissertation was collected from one group of student teachers from one Finnish university. The pupil data, on the other hand, involved three case schools around Finland, with two school grades. However, the participants, their selection for the study, and the teacher and basic education contexts in Finland, were described in detail to increase the inference transferability of the

results (Graneheim & Lundman, 2004). Due to the distinctive characteristics of both the teacher education and the comprehensive school system in Finland, generalising the results to other educational contexts should be done with caution. More studies are needed to validate the findings further. Despite these limitations, this study provides important insights into the academic emotions of two groups of learners, embedded in social interactions and in different learning environments. Thus, the results can be transferred to further research on learners' academic emotions, strengthening the *theoretical transferability* (Maxwell, 1992) of this doctoral dissertation.

The quality of mixed methods research can also be assessed in terms of *transparency* (O'Cathain, 2010; Bryman, Becker, & Sempik, 2008). To strengthen the transparency of this doctoral study, the data collection and analysis procedures have been described in as much detail as possible. Regarding the qualitative analysis, the criteria for the analysis and the visualisations of the processes has been given. Furthermore, citations from the original data have been provided to the reader in the original journal articles. Similarly, the quantitative scales and analysis methods used have been thoroughly described. The *communicative validity* (Kvale, 2007) and the *ecological validity* (e.g. Bryman, 2004) of the results emanating from the doctoral dissertation have been repeatedly tested in frequent discourses within the scholarly community: with supervisors and the research group members, in seminars, conferences, and by the reviewers of the manuscripts related to the publication process of the sub-study articles.

Finally, qualitative research commonly assesses the *pragmatic validity* of the results, referring to the significance of the results to the academia and the option of applying them in developmental practice (Kvale, 1995). The theoretical reflections and educational implications are discussed in more detail in sections 6.2 and 6.3.

6.1.2 Sub-analysis specific reflections

Interviews. Semi-structured interviews were utilised to analyse student teachers' academic emotions (*Study I*), and emotional patterns and their triggers (*Study II*) in teacher education settings. In emotion research, the structure of interviews has been criticised as possibly influencing the results in situations in which participants deliberately hide their emotions or are unaware of them and their sources (Wosnitza & Volet, 2005). Hence, to answer this criticism the participants were not merely asked about their emotions, but questions about the key study experiences were addressed to them in order to promote the explanation of the emotions experienced during the study track (e.g. Järvenoja & Järvelä, 2005). Moreover, focusing only on emotions might have caused student teachers to feel pressured to recall study-related emotions. Allowing the participants to reflect freely on their study path resulted in rich interviews, in which both the quality and the origin of

the academic emotions were described in detail. Furthermore, a retrospective approach facilitated an explorative analysis of academic emotions, emotional patterns and their triggers. A limitation to be noted in using a retrospective approach is that the emotions and associated learning experiences are always situated at a certain point of time, context and participants' overall life situation, and therefore it may be challenging to recall and summarise these in a single interview at the end of the academic journey (e.g. Angelides, 2001; Cox & Hassard, 2007). Furthermore, due to the retrospective method, the emotions participants recalled are inevitably reinterpreted emotions. Thus, these memory and reinterpretation effects may have influenced the data by generalising the experiences. The visualisation method was utilised as part of the interview to help the participants to produce verbal information (e.g. Kress & Leeuwen, 1990). The visual object also helped student teachers to perceive different time points and tie their experiences to the study path. Thus, the retrospective approach combined with the visualisations gave the participants a unique opportunity to reflect on their journey to become a teacher, resulting in rich data. Furthermore, the sample represented the entire student teacher population at the University of Helsinki sufficiently well in terms of age and gender.

Picture tasks. The picture task instrument (*Study III*) was employed to collect an extensive data set of pupils' emotionally loaded reports of the social learning environment at school. The research design was based on the assumption that pupils will cast their perceptions, desires and emotions onto neutral pictures (Branthwaite, 2002). Furthermore, the pictures were created by a set of photographs of school day situations, and they were ecologically validated by the pupils. This method made it possible to gain new insight concerning the emotions that are often tacit and difficult to articulate (Porr et al., 2011). However, picture tasks do not automatically produce descriptions of actual events, but rather projections of pupils' emotions and perceptions of social events at school. Still, it may be argued that the results of *Study III* also validated the picture task instrument.

Content analysis. Both the student teacher interviews (*Studies I* and *II*) and the pupil picture tasks (*Study III*) were qualitatively content analysed using an abductive approach (e.g. Morgan, 2007; Patton, 1990). The strength of the abductive strategy was the combination of both theory-driven (Patton, 1990) and data-grounded (Harry, Sturges, & Klingner, 2005) procedures, making it possible to obtain a continuous connection between the empirical observations and the theories from the literature (e.g. Coffey & Atkinson, 1996; Levin-Rozalis, 2004; Morgan, 2007). The analyses were carried out in a diverse and multiphase manner. Various categories were compared and combined to reach the overall analysis, resulting in a rich understanding of emotional experiences in different learning environments.

Survey. A survey (*Study III*) was utilised to deepen the understanding of pupils' socially embedded academic emotions by exploring the relationship between pupils' emotions and school-related cynicism, thriving at school, school grade and achievement. The validity and reliability of the survey was satisfactory (Pietarinen et al., 2014) and the internal consistency of the cynicism scale was good. However, it should be noted that further construct validation of the scales is still needed. For example, the scales have not been validated in other countries, school systems or environments (Pietarinen et al., 2014).

6.1.3 Ethical reflections

This doctoral dissertation followed the ethical guidelines of the Finnish Advisory Board of Research Integrity (2012) for the responsible conduct of research. Accordingly, integrity, meticulousness, and accuracy in recording, presenting, and evaluating the research results were followed. All three sub-studies were carried out without causing any harm to the participants involved. Furthermore, the anonymity of participants was guaranteed, and they were treated respectfully in all three sub-studies and in the summary of the doctoral dissertation. Furthermore, the privacy of the participants was guaranteed, and personal information and direct identifiers have been removed from the reported results in a way that the participants cannot be identified from the text. Regarding the student teacher cohort, research consent was granted by the Faculty of Behavioural Sciences at the University of Helsinki. Consent to participate in the pupil study were received from the chief officers of the school district, the case schools and the parents. Furthermore, the participation in all sub-studies was voluntary for both the pupils and student teachers and no additional compensation was given for participation. In addition, the participants had the option to withdraw from the study at any point of the process. Finally, this doctoral dissertation respected the ethical values of honesty and accuracy at every point of the research process (Steneck, 2007).

6.2 Results in the light of previous literature and theoretical contribution

In this doctoral dissertation, two groups of learners, student teachers and comprehensive school pupils, were explored in order to understand the anatomy of academic emotions, and to identify both contextual and invariant elements of such emotions. The focus was particularly on exploring socially embedded academic emotions in both student teachers and pupils.

Invariant and contextual elements of student teachers' and pupils' academic emotions

Exploring two groups of learners, student teachers and pupils, showed that studying in teacher education and in comprehensive school are highly emotionally coloured. Both groups of learners reported a wide range of positive and negative academic emotions. However, the tone of the student teachers' emotional landscape seems to be more positive compared to that of the pupils: student teachers described a high number of positive emotions, whereas most of the emotions reported by the pupils were negative. A reason for the positively loaded emotional landscapes of the student teachers that were strictly related to their professional development, may be that student teachers are studying in an educational program with highly competitive admission (only 8 per cent of the applicants admitted yearly (University of Helsinki, 2017)). Furthermore, they represent motivated students with excellent academic track records. This was also reflected in the results, as the motivational tone of the student teachers' positive emotions was high. It must be noted that such a positive emotional landscape may not be found in countries where the status of teachers is lower. Still, the variety of student teachers' positive emotions was narrower and less specified compared to their negative emotions. One reason for this may be that positive emotions are typically harder to distinguish, characterise and explicate (e.g. Ekman, 1992) as their function for our survival and wellbeing is not as radical compared to negative emotions (Fredrickson, 2001). In turn, pupils' negatively coloured emotional landscape might be the result of the delicate age they are at. Sixth and eighth graders face many developmental changes, such as puberty, on the top of the school transition that they have either undergone or are approaching. It could be argued that from pupils' point of view, life outside school is seen as more important and interesting and the school itself as mandatory and restricting. Furthermore, studies have shown that school-related interest declines considerably after the first few years of school and increases only moderately during secondary school (Frenzel, Goetz, Pekrun, & Watt, 2010). Also, the tone of pupils' peer-related academic emotions was negative, implying that school is also a place where it is impossible to choose all your peers and that exclusion in peer relationships seems to be a rather common feature in adolescent life.

Accordingly, the results showed that social interactions, both in teacher education and at comprehensive school, provide significant arenas for academic emotions. Both student teachers and pupils emphasised emotions in teacher(educator)-learner interaction. The result supported Mainhard and his colleagues' (2018) recent suggestion that the teacher's role in learners' emotions is crucial. Student teachers' emotions relating to their interactions with teacher educators were most commonly negative, confirming the previous findings suggesting that student teachers' negative emotions were frequently related to their teaching practice su-

pervisors (Timoštšuk & Ugaste, 2012). Student teachers also emphasised emotions, especially regarding teaching practice providing authentic experiences of learning to teach which is at the core of student teachers' professional development. Thus, it is not surprising that practice experiences are extremely emotionally loaded with both positive and negative emotions. Role of teaching practice as an emotionally intensive experience has frequently been reported also in prior studies (Hascher & Hagenauer, 2012; Timoštšuk et al., 2016; Timoštšuk & Ugaste, 2012; Yuan & Lee, 2016). During teaching practice, particularly the interaction with the pupils, provided a source of student teachers' emotions that were typically positive. This indicated that student teachers perceive the teacher-pupil interaction as being meaningful, and emotionally positively coloured, which may further prompt their self-efficacy and professional development. Also, pupils emphasized the importance of teacher-pupil interactions in terms of socially embedded academic emotions, but they described both positive and negative emotions more evenly. Further investigation showed that those pupils who expressed more negative emotions compared to positive, were more cynical towards school work and enjoyed going to school less. This implies that the role of the teacher-pupil relationship is quite significant in pupils' school enjoyment. Pupils' negative emotions in teacher-pupil interactions were commonly related to pupils' misbehaviour or teachers' instructional behaviour, both in and outside formal teaching and learning. This is in line with earlier studies that suggested that pupils' misbehaviour is a particular source of teachers' negative emotional experiences (e.g. Becker et al., 2014; Gläser-Zikuda & Fuβ, 2008; Rantala & Määttä, 2012; Sarason, 1984; Ulmanen et al., 2016). These findings further imply that negative emotions in teacher-pupil interactions transfer from both parties to each other, creating a vicious circle that could possibly be prevented by emotional regulation.

The results further showed that peer interactions play a significant role for both student teachers' and pupils' socially embedded academic emotions. In terms of the student teacher findings, the results are in line with prior studies that showed that negative emotions during teaching practice are related to fellow student teachers (Timoštšuk & Ugaste, 2012). Negative emotions in peer relationships were an even more distinctive feature of pupils' school related emotional landscape. The emotions were commonly related to bullying, peer rejection and other misbehaviour in informal learning environment that held increased risk of the exposure of such behaviour that was due to the lack of direct teacher supervision (Veenstra et al., 2014). Although, pupils described a vast number of negative emotions in peer interaction, it was not associated with cynicism towards school work. A reason for this might be that negatively toned peer interaction does not necessarily result in reduced engagement in academic activities provided by the school. In fact, peer rejection might be the result of the high academic engagement shown by a pupil, if such behaviour is not accepted in their peer group. However, there were no associations between the experience of thriving at school and the emotional tone

of peer interaction. A reason for this might be that the some of the participants may have interpreted the question concerning thriving at school as referring exclusively to the academic activities of school.

A distinctive difference between the student teachers' and pupils' academic emotions was that student teachers' emotions were rarely situated in informal learning environments, but rather were related to formal studying situations, whereas informal learning environments seemed to form a significant arena for pupils' academic emotions. Student teachers' academic emotions were most commonly situated in major courses and teaching practice periods; these can be considered to form the basis of student teachers' professional development to become a teacher. Furthermore, practice experiences especially give them real life opportunities to test what they already know and what they still need to learn. In this sense, these activities create meaning for the student teachers. Also, their peer-related emotions were commonly related to the same activities of teacher education and only rarely situated outside formal teaching and learning. One reason for this may be that formal practices of teacher education include structures that provide time and opportunities for the student teachers to reflect together their development and give each other both emotional and social support (e.g. Väisänen, Pietarinen, Pyhältö, Toom & Soini, 2017; Ahonen, 2018).

Pupils' socially embedded academic emotions with peers, on the other hand, were commonly related to the informal settings of school, confirming the findings of prior studies (Veenstra et al., 2014). As peer relationships are highly significant for early adolescence, and informal environments form the main arena for social encounters between friends and peers, it also is the setting that evokes most of the peer related emotions. The large number of negative peer-related emotions, experienced both at comprehensive school and in teacher education, may be an indicator of peer relationships providing a challenging and burdening, but also highly meaningful, emotionally loaded context for both groups of learners. Facing such challenges requires well-developed social problem-solving skills, while insufficient abilities might increase self-doubt and insecurity. Accordingly, both groups of learners might benefit from more hands-on practice and active ways to process the problems of peer interaction. Mastering these skills and abilities would make it possible to utilise peers as a resource for learning.

The results also showed that social support played an important role for both school and teacher study experiences. Lack of social support from peers, teachers and educators was related to negative emotions in both groups of learners. Providing and receiving feedback, help and support from others aroused positive emotions. Social support seemed to be a significant trigger for the student teachers' academic emotions and emotional patterns. The findings imply that receiving support plays a significant role in building learning environments that enable learners to flourish, by keeping the tone of the emotional experiences positive. Still, student teachers described more academic emotions in individual activities than in

social activities. A reason for this might be that university studies entail quite a bit of autonomy and individual study, which also reflected in the results. Perhaps teacher education does not utilise collaborative learning to the optimal extent. For instance, group work does not automatically lead to shared goals and social support, and hence might not elicit academic emotions that are as meaningful as those from individual learning situations. The social embeddedness of academic emotions could benefit from further study, as the differences between individual and social emotional experiences have not been explored in prior studies in education.

Theoretical and methodological contribution of the study

In addition to identifying some invariant and contextual elements of learners' academic emotions, the study contributes to the literature in the following ways. Firstly, it proposes an expansion to the concept of academic emotions from the emotions that are experienced during learning, studying and teaching to the emotions that are experienced in pedagogically-orchestrated learning environments. A benefit of the extension is that it is inclusive in terms of informal environments, such as recess, within educational settings, and thus it goes further than previous frameworks that are more strictly connected to the object focus of the academic emotions (e.g. Pekrun, 2006; Pekrun & Linnenbrinck-Garcia, 2012).

Secondly, this study contributes to theoretical understanding by widening the spectrum of student teachers' academic emotions that has previously been identified in the literature on academic emotions. It might be that expanding the definition of academic emotions brought to light a wider spectrum of academic emotions than previous studies.

Thirdly, the study focuses on exploring the social embeddedness of academic emotions that has been previously neglected in research (e.g. Fisher & Kleef, 2010; Uitto et al., 2018). In this doctoral dissertation, a different approach compared to the traditional view on social emotions was adapted. Rather than defining emotions as being "social" based in their developmental origin, in this doctoral dissertation all emotions that are related to social interactions between two or more individuals were seen as socially embedded emotions. Accordingly, by exploring these emotions in teacher education and in comprehensive schools, the study sheds light into the role of social interaction in learners' academic emotions.

Fourthly, the results from this doctoral dissertation imply that some of the emotional components (e.g. Frenzel & Stephens, 2013, Plutchik, 2001; Russell, 2003; Shuman & Scherer, 2014) of academic emotions were more explicitly expressed than others. As the results showed, student teachers' positive and negative emotional experiences were commonly both motivationally loaded and highly task related, referring to the motivational and cognitive components. Socially embedded

academic emotions, especially pupils', additionally showed the expressional component that serves as the communication and understanding of others' emotions.

Fifthly, the results regarding the student teachers' emotional patterns confirm the previous findings, implying that the valence and the arousal of the emotions may change and evolve over time, resulting in emotional patterns in each situation (e.g. Barrett & Russell, 1998; Kleine et al., 2005; Pekrun et al., 2002; Sonnemans & Frijda, 1994). Yet the results indicated that the duration of the pattern was not associated with the emotional tone, contributing to the understanding of emotional patterns. To my knowledge, student teachers' emotional patterns have not been studied before, and thus, this doctoral dissertation provided new knowledge on the quality of emotional patterns during the process of becoming a teacher.

Sixthly, the pupil results showed that socially embedded emotions did not vary between pupils from different school grades, as no differences between sixth and eighth graders' described emotions in teacher-pupil and in peer interactions were detected. This partly contradicts the findings of previous studies, suggesting that teacher-pupil relationships may be more positively emotionally toned at primary school than at secondary school, as the primary school teachers spend more time with their students and thus have more opportunities to create positive relationships with them (Hagenauer et al., 2015; Symonds & Galton, 2014). The results also contradict findings of prior studies (e.g. Beilock et al., 2010; Pekrun et al., 2002; Pekrun et al., 2010) by suggesting that there is no association between the GPA and the socially embedded academic emotions in teacher-pupil and peer interaction. One reason for this may be that the impact of socially embedded emotions is not conveyed to the GPA of all school subjects, but the relationship might rather be indirect, through school engagement, for example (Pietarinen et al., 2014). Best friends' emotions, for example, have been shown to impact indirectly on pupils' academic achievement through their own emotional experience in English and mathematics subjects (Reindl et al., 2018). We are still in the early stages in our understanding of how emotions embedded in the schools' relationships impact pupils' achievement. Accordingly, further studies are needed to explore the potential mechanisms mediating the effects.

Finally, multimethodological research focusing on the emotions in education has so far been limited (e.g. Bieg et al., 2014; Pekrun & Linnenbrinck-Garcia, 2014; Pekrun & Schutz, 2007), thus this doctoral dissertation brings a fresh approach to exploring academic emotions and responding to the need for complementary emotion research by utilising a mixed methods approach.

6.3 Educational implications

Based on the findings, some educational implications that might be useful in designing emotionally optimal learning environments, for both student teachers in teacher education and pupils in comprehensive school, can be made.

First of all, the results imply that teachers and teacher educators need to learn to identify the learners' academic emotions and understand their learning-related functions. This demands that they first learn to acknowledge, identify and regulate their own emotional states. Secondly, education should facilitate positive activating emotions enhancing motivation and contributing to positive and ascending emotional patterns. In contrast, negative deactivating emotions, and especially prolonged negative and descending patterns, should be avoided as they are the most detrimental to learning. The results suggested that negative and descending patterns typically resulted from failure or disappointment in studying, implying increased risk for reduced study engagement. For example, the fear of failure is likely to reduce self-efficacy, promote avoidance behaviour and withdrawal from challenging tasks and situations. Yet, not all negative emotions should be seen as alarming or problematic. For example, experiences of anxiety may be useful for the learner if the emotion still supports the long-term learning goals (Tamir, 2009). In this sense, teachers and teacher educators should learn to identify the saturation point of the emotion, i.e. the point at which the negative emotional state starts to become detrimental in terms of learning.

It must be also noted that constant fluctuation of emotions, especially if combined with perfectionism, can be burdensome and result in study exhaustion (e.g. Stoeber & Rennert, 2008). This may further lead to cynicism towards studying, due to the emotionally ambivalent study experience. Yet the results indicated that the duration of the emotional pattern was not associated with its emotional tone, further implying that negative emotional experiences do not cumulate over an extended period and positive emotions are not experienced only briefly. Thus, it might be that the duration of the emotional experience does not necessarily determine its significance. As such, educators need to be aware that even short encounters may be significant in terms of learner's emotional load and thus should not be understated.

In many ways, an emotionally optimal learning environment includes the same elements that characterise meaningful learning. For instance, providing well fitted challenging tasks that meet the learner's skills is likely to promote not only learning, but also emotionally optimal learning experiences. Also, social support is a crucial element in terms of learning, but also a major elicitor of positive emotions. Thus, learners need appropriate informal and emotional support provided by teachers and educators. Still, the creation of an emotionally optimal learning environment is not the responsibility of only teachers and educators. Learners themselves need to learn to take an active part, seek help, and provide support for their peers and other members of the learning community. As such, the emotional tone

of the learning environment is to far extent determined by the quality of its social relationships. More importantly, individuals can learn to regulate and co-regulate their academic emotions in the way that it promotes emotionally optimal learning. The results of this study imply that there is wasted opportunity in this regard, since pupils' peer-related emotions in formal teaching and learning were rarely reported. Perhaps neither student teachers nor pupils recognise their peers as key resources in terms of learning. Pupils are still in a process of practising their emotional and empathy skills that further help them to provide support to others. Thus, it would be important to provide them opportunities and safe arenas for developing their emotion regulation and co-regulation skills. On the other hand, student teachers' future work is highly autonomous, thus sometimes burdening and lonely. In this sense, student teachers should learn to utilise each other as a resource for support, learning and co-creation.

Teaching is an emotionally loaded profession (Mevarech & Maskit 2014; Soini et al. 2010). In-service teachers experience love and care for their pupils, but also elevated levels of negative emotions, including inadequacy and cynicism (e.g. Sutton & Wheatley, 2003; Postareff & Lindblom-Ylänne, 2011). Novice teachers are especially exposed to high negative emotions and teacher turnover is sadly common (Heikonen et al., 2018; Skaalvik & Skaalvik, 2011; Struyven & Vanthournout, 2014). Whether this is due to the reality shock (e.g. Veenman, 1984; Kim & Cho, 2014) that the novice teachers face when entering the classroom or their day-to-day experienced anxiety, confusion and elevated levels of stress (Mevarech & Maskit, 2014), teacher education should take action. Although the emotional load of the work is shown to decrease over time (Mevarech & Maskit, 2014), student teachers can start to learn how to face the emotional aspects of their future work during the teacher studies. This requires providing future teachers with pedagogical knowledge about the impact of emotions in education, and preparing them to tackle the challenges in future classrooms with a skill set for identifying emotional states. If student teachers and teachers want to learn to regulate their pupils' emotions, they first need to know how to regulate their own emotional states and reactions. Thus, student teachers should learn to utilise their negative emotions to help them to cope in stressful events in the future classroom in order to tackle work-related stressors and lead them in creating more inspiring learning environments for their pupils and themselves. Developing the practices of teacher education may have prolonged effects on the pupils' academic performance and career choices, if the future teachers welcome emotions as part of the learning in the classroom.

Developing emotionally optimal learning environments calls for understanding the social embeddedness of academic emotions. In-service teachers should understand the function of academic emotions in social interactions and realise that they are transferred from one interaction partner to another, and possibly even

wider. Accordingly, it is important to understand that teacher's displayed emotions, for instance during formal teaching, may have profound effects on pupils' emotional experiences, and further on their academic achievement. As teachers' positive emotions have been shown to promote pupils' learning related enjoyment, teachers should make sure that they remember to share and display their positive emotions during teaching (Frenzel et al., 2018). Yet, all possible display of positive emotions does not support pupils' enjoyment. The emotional experiences need to be real, as displaying fake positive emotions may actually have completely contradictory effects on pupils' emotions (Frenzel et al., 2018). In addition, negative emotions in teacher-pupil interaction are related to pupils' perceived cynicism and low levels of school enjoyment. As such, the teacher-pupil interaction plays a significant role in learners' emotions and further in their school experiences, and thus should be acknowledged by teachers and educators. Emotions cannot be "shut down" and they presumably follow the learners from the informal learning environments to the formal learning practices, and vice versa. Thus, teachers should learn to "scan" and identify their pupils' emotional states, identify the triggers of the emotional experiences, and if needed, process them with the pupils. This might help to interrupt the dysfunctional disruptive emotional states. Without the intervention, teachers may keep pushing further with the teaching agenda, leading to mutual frustration and a negative cycle that is detrimental to both learning and the teacher-pupil relationship. Hence, it would be important for the teacher to know when the existing social problems need to be solved at the beginning of formal teaching and in this way, prepare the pupils to be more emotionally wired to learn.

Based on earlier findings, it has been shown that most meaningful learning experiences are connected with an opportunity to express and experience emotions (Kostiainen et al., 2018). The results of this doctoral dissertation support this finding and further suggest that teachers, educators and educational developers need to take the emotional aspect seriously, create environments where it is safe to practise emotional skills, foster the opportunities for emotional sharing, and finally bring the emotional aspects of learning to centre stage.

6.4 Recommendations for future research

While this dissertation started to unveil the social embeddedness of emotions in learning environments, it also brought new questions that are still waiting to be answered by future research. As a final chapter of this doctoral dissertation, suggestions for future research are in order. The research field focusing on academic emotions in educational settings is still in its early stages of development (Pekrun & Schutz, 2007) even though the number of studies is constantly and rapidly increasing. The previous studies on academic emotions have commonly concen-

trated on the relationship between the emotions and academic achievement. However, it seems that the focus is shifting towards other relationships and aspects of academic emotions. In particular, research exploring social embeddedness is still lacking, although the importance of academic emotions and social interactions has been recognised. Thus, this doctoral dissertation presents options for several further lines of research.

First, as this study only provided a snapshot of socially embedded academic emotions described by pupils at school, further research on this is needed. In future, it would be interesting to find out how socially embedded emotions at school develop over time by utilising longitudinal research. The research design used in this doctoral dissertation was based on the projections and the presumption that pupils will represent their own emotional experiences or emotions they perceive at school. Hence, in future, it would be fruitful to validate the instrument further to suit emotion research even better. This could be reached by including other qualitative methods, such as interviews.

Secondly, in addition to validating the instrument, it would be particularly interesting to move towards real life social encounters in education, and the emotions embedded in them. The results in the teacher education context showed that student teachers retrospectively acknowledge social encounters as the origin of many of their elicited emotions on their study path. Furthermore, pupils' descriptions showed that social relationships are a major arena for the socially embedded emotions in their everyday life at comprehensive school. In future, the research on socially embedded emotions could provide more information on the phenomenon by observing or filming the social encounters situated both in formal and informal learning environments. In this way, the next step could be taken to understand the impact of social emotions. Also, stimulated recall interviews (for both social encounter partners, and possibly with third persons present) would be beneficial, to capture the emotions that are sometimes not allowed to be shown in educational settings.

Thirdly, this doctoral dissertation indicated that the informal learning environments are important arenas for academic emotions. The transition from informal settings to formal teaching and learning should therefore be explored in more detailed. This relationship has been neglected in prior research on academic emotions, but would produce a significant new understanding of how to make the formal learning environments emotionally optimal in terms of learning.

Fourthly, in terms of the socially embedded academic emotions, it would be interesting to deepen the understanding by finding out what triggers these emotions in more detail, for example in the classroom. Are the socially embedded academic emotions triggered by learning tasks that are carried out in the social interaction or by the relationships between a teacher and a pupil? To capture this, richer data and finer analysis would be needed.

In addition, it would be important to take a closer look at momentary academic and socially embedded emotions, and how they might accumulate in longer-term patterns of emotional functioning. This would widen our understanding of emotional patterns in educational settings.

Finally, in future research, it would be useful to ask questions related to how the academic emotions experienced during teacher education impact on future teachers' teaching, social interactions, pupils' learning, and their own emotional experiences in classroom. Answering these questions might bring us new tools with which to tackle the problem of novice teachers' reality shock and turn-over intentions by obtaining diagnostic information to support the development of both the school community and teacher education.

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Appendices

Appendix A The semi-structured student teacher interview

Introduction for the interview
Today we are going to go through your experiences during teacher education and thoughts regarding teachers' work. The interview data will be treated confidentially, and only the members of the research group will handle it. Also, the identity of the participants will be protected, and they cannot be identified from the reported results. The interview is divided into three parts: first I will ask you for some background information, then we will discuss your experiences during teacher education, and at the end I would like you to reflect on your future work as a teacher.

I I as a teacher and my teaching experience
1. What kind of teacher qualification will you receive after completing your teacher education? Are you studying to become a primary school teacher or a subject teacher?

2. What made you want to become a teacher?

3. How much do you currently have experience on teachers' work? Do you have any other teaching experience in addition to compulsory teaching practice included in teacher education programme? If so, what kind of experience and how much experience do you have?

II Conceptions of your own agency in teacher education
4. Your will graduate soon. What are your thoughts concerning the teacher education, and how do you feel regarding your studies?

5. Describe and visualise your learning path in teacher education in this paper. The image may be a timeline or other suitable way to describe the study path. Mark the significant events of your study path to the visualisation. The situation may be:

- positive/inspiring or negative/frustrating situation
- a single encounter with a person or a longer course / study period, during which you have learnt something essential for your future work.

The following questions are support questions for visualisation-based interview. Each event was recalled by addressing these questions.

- What happened? Can you tell more about the event? Who was there?
- What made the event particularly significant?
- What changed during the event (thought or activity)? What did you think first? How did your thoughts change after the event? What made you change your thought or actions? How did you feel?
- What essentials did you learn about teachers' work and being a teacher?
- How typical / atypical was the study situation you described? If the situation was atypical, what is the typical learning situation in teacher education?

In addition to the above-mentioned situations, do you have in mind any longer episodes that influenced your thoughts of being a teacher or alternatively, situations that in a surprising and quick way influenced your conceptions of being a teacher?

6. Have your thoughts changed during your teacher education? If so, how? Could you describe briefly how your thoughts have changed during your study path? What did you think at the beginning of your studies, and what do you think now?

7. How would you describe teacher education from a student's perspective? How is the studying here? Describe a typical day of study, and what happens during the day.

8. How do you think that a teacher educator perceives the learning environment? How is the everyday work of teacher educators here?

9. How would you describe a typical situation of education in teacher education? What happens? What does the teacher educator do? What do the student teachers do?

10. Which of your strengths has the teacher education supported?

11. Is there any challenge / question / issue that makes you wonder about your future work as a teacher? If so, where do you get support from at the moment?

12. Do you think that teacher education should be further developed? If yes, how? What should be done to reach that aim you just described?

III Perceptions about teacher's professional agency in primary school

13. How is the everyday life at school from a teacher's perspective? Describe a typical work day. What happens during the day?

14. How is the everyday life at schools from a pupil's perspective? Describe a typical school day. What happens during the day?

15. You are almost a qualified teacher. What do you consider your core tasks as a teacher to be? Why? How do you act in order to achieve your goals and to fulfil your core task?

16. Describe a typical lesson in your future class. What happens? What does the teacher do? What do the students do?

17. How do you perceive the importance of the professional community for your future work?

18. How would you like a) your pupils b) the parents c) the headmaster and other teachers to describe your working as a teacher?

19. Do you think that primary schools should be developed further? If yes, to what direction? How would we get into a situation you described?

20. Is there anything else that you would like to tell me or clarify further?

Thank you!

Appendix B The pupil picture task -instrument



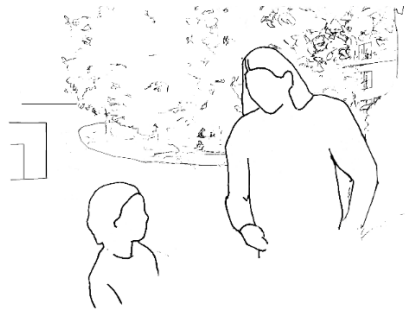
What is happening at the moment?

What has led to the event shown?

What is the pupil/pupils thinking?

What is the teacher thinking?

What will happen next?



What is happening at the moment?

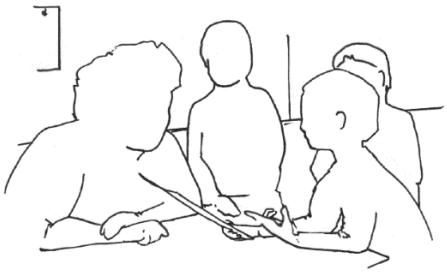
What has led to the event shown?

What is the pupil/pupils thinking?

What is the teacher thinking?

What will happen next?





What is happening at the moment?

What has led to the event shown?

What is the pupil/pupils thinking?

What is the teacher thinking?

What will happen next?

What is happening at the moment?

What has led to the event shown?

What is the pupil/pupils thinking?

What is the teacher thinking?

What will happen next?

Appendix C The items, scales and Cronbach alpha included in the pupil survey

Cynicism -scale: Cronbach's alpha = .83	"Going to school doesn't interest me at all" "I often feel like playing truant from school" "Going to school feels unnecessary" "Often I feel I really don't want to come to school" "We have to study some quite useless stuff"
Thriving at school item:	"Please estimate, on a scale of 1 to 10: How much do you enjoy going to school? (1= not all, 10= very much)"

Appendix D Example of the emotional pattern and the coding procedures

"The maths course was amazing… an amazing course and first of all I have to say that the teacher educator was a very inspiring teacher and a good example of how someone who is really interested in her subject can make us enthusiastic as well […] And I just hope that I could be the same, that I could get my students to be enthusiastic about learning."

(Participant 1: positive pattern (enthusiasm, admiration, enthusiasm, hope), medium length, expectancy value)