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Early-career teachers' professional agency in the classroom

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Abstract

In this dissertation, I explored early-career teachers' professional agency in the classroom. This refers to a teacher's capacity for active, intentional and skilful learning in classroom interaction. The focus of the thesis is the anatomy of early-career teachers' professional agency in the classroom and its relationships with inadequacy in teacher-pupil interaction and intentions to leave the teaching profession. Furthermore, I examined the strategies that early-career teachers apply in successful and challenging classroom situations. The dissertation consists of three studies each including a separate data set: cross-sectional survey data from teachers with five or fewer years of experience (N = 284), longitudinal survey data from teachers (N = 268) during the three first years of teacher education (N = 268), and stimulated recall interview data from teachers (N = 31) during a teaching practice period at the end of their studying (N = 31). Thus, the study drew on mixed methods research applying both quantitative and qualitative methods. Survey data sets were analysed primarily by means of structural equation modelling (SEM) whereas the interview data were analysed with content analysis.

Study I examined the associations between early-career teachers' turnover intentions, perceived inadequacy in teach-pupil interaction and professional agency in the classroom during the first five years in teaching. The results showed that considering leaving the teaching profession was positively related to questioning one's own abilities in teacher-pupil interaction that was further negatively related to early-career teachers' motivation, self-efficacy beliefs and strategies for constructing collaborative learning environments through active reflection in the classroom. Work experience was negatively related to failure experienced in teacher-pupil interaction. It seems that considering leaving the profession may embrace negatively balanced judgments about one's performance in classroom interaction, which further hinders early-career teachers' capacity and efforts towards actively analysing and transforming pedagogical practice and the learning environment. Through experience of working in the classroom, early-career teachers may learn functional strategies for controlling classroom interaction situations.

Study II focused on the anatomy of early-career teachers' professional agency in the classroom during the first three years in teacher education. According to the results, early-career teachers' capacity to reflect actively in the classroom was positively associated with their learning by modelling other teachers and by con-

structing collaborative learning environments with pupils, which were further positively related with their sense of competence for promoting learning in the classroom. Furthermore, the interrelations between these contextualised modes of professional agency in the classroom showed a tendency to decrease during the second year and then increase during the third academic year. It seems that the interrelations between the modes of professional agency in the classroom vary, still maintaining a functional capacity enabling early-career teachers' active and skilful learning in the classroom. In that process, intentional learning from and with others in the classroom became even more substantial.

In Study III, the instructional strategies that early-career teachers applied in classroom interaction situations during teaching practice periods in teacher education were investigated. Early-career teachers most often used reactive behavioural strategies that included quick, rigid and survival-oriented responses predominantly in challenging classroom situations. Proactive cognitive strategies, including active monitoring of pupils' actions and deliberate interpretations of classroom situations, enabled flexible, adaptive and transformative responses mainly in positive situations. Proactive cognitive strategies seemed to determine classroom situations functional for learning professional agency in the classroom, whereas reactive behavioural strategies seemed to inhibit such learning opportunities.

Teachers' learning has been broadly studied, yet research on early-career teachers' professional agency in the classroom is scarce. This dissertation study contributes to the literature on early-career teachers' learning by showing that the contextualised modes of professional agency in the classroom each have their operations in fashioning motivation, self-efficacy beliefs and strategies into a functional capacity for active skilful learning in the classroom. Moreover, early-career teachers' professional agency in the classroom is challenged in many ways by the complexities of teacher-pupil interaction. The quality of instructional strategies is central in determining classroom situations suitable for learning professional agency in the classroom.

Lauri Heikonen

Uran alkuvaiheen opettajien ammatillinen toimijuus luokkahuoneessa

Tiivistelmä

Tässä väitöskirjassa tutkittiin uran alkuvaiheessa olevien opettajien ammatillista toimijuutta luokkahuoneessa, jolla tarkoitetaan opettajan kapasiteettia oppia aktiivisesti, tavoitteellisesti ja taitavasti luokkahuonevuorovaikutuksessa. Väitöskirjassa tarkasteltiin uran alkuvaiheen opettajien ammatillisen luokkahuonetoimijuuden anatomiaa ja yhteyksiä riittämättömyyden kokemiseen opettaja-oppilas-vuorovaikutuksessa ja ammatinvaihdon harkitsemiseen. Lisäksi tutkittiin uran alkuvaiheen opettajien käyttämiä strategioita heille oppimisen kannalta merkityksellisissä onnistuneissa ja haasteellisissa luokkahuonetilanteissa. Väitöskirja koostuu kolmesta osatutkimuksesta, joissa kaikissa oli oma tutkimusaineistonsa: poikittaistutkimuksena toteutettu kysely opettajilta, jotka olivat toimineet 0-5 vuotta opettajan ammatissa (N = 284), pitkittäistutkimuksena kerätty kysely opettajilta heidän kolmen ensimmäisen opiskeluvuoden aikana opettajankoulutuksessa (N = 268) ja video-stimuloitu haastatteluaineisto, joka kerättiin opettajilta opetusharjoittelussa opintojen loppuvaiheessa (N = 31). Väitöskirja on monimenetelmällinen tutkimus, jossa käytettiin kvantitatiivisia ja kvalitatiivisia tutkimusmenetelmiä. Kyselyaineistot analysoitiin ensisijaisesti rakenneyhtälömallinnuksen keinoin ja haastatteluaineisto analysoitiin sisällönanalyysillä.

Ensimmäisessä osatutkimuksessa tutkittiin uran alkuvaiheen opettajien ammatinvaihdon harkinnan ja opettaja-oppilas-vuorovaikutuksessa koetun riittämättömyyden yhteyksiä ammatilliseen toimijuuteen luokkahuoneessa. Tulokset osoittivat, että ammatinvaihdon harkitseminen oli positiivisesti yhteydessä omien taitojen kyseenalaistamiseen opettaja-oppilas-vuorovaikutuksessa, joka oli edelleen negatiivisesti yhteydessä uran alkuvaiheen opettajien kokemaan motivaatioon, minä-pystyvyyteen ja taitoihin oppia reflektoimalla ja yhteisöllistä oppimisympäristöä rakentamalla luokkahuoneessa. Vaikuttaa siltä, että ammatinvaihdon harkitseminen voi aiheuttaa epätasapainoa oman toiminnan arviointiin luokkahuoneessa, mikä edelleen heijastuu heikentävästi uran alkuvaiheen opettajien kykyyn aktiivisesti analysoida ja muuttaa pedagogista toimintaa ja oppimisympäristöä.

Toisessa osatutkimuksessa keskityttiin uran alkuvaiheen opettajien ammatillisen luokkahuonetoimijuuden anatomiaan ensimmäisen kolmen opiskeluvuoden aikana. Tulosten mukaan kyky reflektoida aktiivisesti luokkahuoneessa oli positiivisesti yhteydessä uran alkuvaiheen opettajien kokemaan kapasiteettiin oppia muiden opettajien opetusta mallintamalla ja yhteisöllistä oppimisympäristöä ra-

kentamalla yhdessä oppilaiden kanssa. Nämä ammatillisen luokkahuonetoimijuuden muodot olivat positiivisesti yhteydessä uran alkuvaiheessa olevien opettajien kokemaan opettamisen kompetenssiin. Luokkahuonetoimijuuden kontekstuaalisten oppimisen muotojen väliset yhteydet heikkenivät toisena vuonna ja jälleen kasvoivat kolmantena vuonna. Luokkahuonetoimijuuden kontekstuaalisten oppimisen muotojen väliset suhteet näyttäisivät vaihtelevan niin, että toisilta opettajilta oppimisen ja yhdessä oppilaiden kanssa oppimisen merkitys korostuu ammatillisen toimijuuden kehittymiselle.

Kolmannessa osatutkimuksessa tutkittiin uran alkuvaiheen opettajien luokkahuonevuorovaikutuksessa käyttämiä strategioita opettajankoulutuksen opetusharjoittelussa. He käyttivät useimmiten reaktiivisia behavioraalisia strategioita, jotka olivat nopeita, jäykkiä ja selviytymiskeskeisiä reagointeja pääosin haastaviksi koetuissa tilanteissa. Proaktiiviset kognitiiviset strategiat, mukaan lukien aktiivinen oppilaiden toiminnan monitorointi ja tarkkojen tulkintojen tekeminen, mahdollistivat joustavat, mukautuvat ja uudistavat toimintatavat pääosin onnistuneiksi koetuissa tilanteissa. Kognitiiviset proaktiiviset strategiat vaikuttavat määrittävän luokkahuonetilanteita toimiviksi ammatillisen toimijuuden oppimisen kannalta, kun taas reaktiiviset käyttäytymisstrategiat näyttävät rajoittavan oppimismahdollisuuksia.

Opettajien oppimista on tutkittu laajasti, mutta uran alkuvaiheen opettajien ammatillista toimijuutta on tutkittu hyvin rajallisesti. Tämä väitöskirja tuottaa tietoa uran alkuvaiheen opettajien ammatillisesta toimijuudesta osoittamalla, että sen kontekstuaalisilla muodoilla on omat tehtävänsä oppimisen motivaation, minäpystyvyyden ja strategioiden muokkaamisessa toimivaksi aktiivisen ja taitavan oppimisen kapasiteetiksi luokkahuoneessa. Opettaja-oppilas-vuorovaikutus haastaa monella tavalla uran alkuvaiheen opettajien ammatillista luokkahuonetoimijuutta. Uran alkuvaiheen opettajien käyttämien strategioiden laatu näyttää määrittävän luokkahuonetilanteiden optimaalisuutta ammatillisen toimijuuden oppimiselle.

Avainsanat: opettajien oppiminen, opettajien ammatillinen toimijuus, uran alkuvaiheen opettajat, luokkahuonevuorovaikutus, opettaja-oppilas-vuorovaikutus, opettajan strategiat, opettajankoulutus

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In Helsinki, 23 August 2020
Lauri Heikonen

List of original publications

This doctoral dissertation is based on three original scholarly journal articles that are referred to in the text as *Study I*, *Study II* and *Study III*. The original articles are reprinted in this thesis with the permission of the copyright holders.

I   Heikonen, L., Pietarinen, J., Pyhältö, K., Toom, A., & Soini, T. (2017). Early-career teachers' sense of professional agency in the classroom: Associations with turnover intentions and perceived inadequacy in teacher–student interaction. *Asia-Pacific Journal of Teacher Education, 45*(3), 250-266. doi.org/10.1080/1359866X.2016.1169505

II   Heikonen, L., Pietarinen, J., Toom, A., Soini, T, & Pyhältö, K. (2020). The development of student teachers' sense of professional agency in the classroom during teacher education. *Learning: Research and Practice*. doi.org/10.1080/23735082.2020.1725603

III Heikonen, L., Toom, A., Pyhältö, K., Pietarinen, J., & Soini, T. (2017). Student-teachers' strategies in classroom interaction in the context of the teaching practicum. *Journal of Education for Teaching, 43*(5), 534-549. doi.org/10.1080/02607476.2017.1355080

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Contents

1 Introducton

Teaching is a complex profession that requires active skilful learning continuously from the beginning of teacher education throughout the teacher's career (Borko, 2004; Husu & Toom, 2016; Lampert, 1998; Opfer & Pedder, 2011; Tynjälä, Pennanen, Markkanen, & Heikkinen, 2019; Vermunt & Endedijk, 2011). Such learning cannot be taken for granted or explained by a single behavioural attribute, but instead it requires professional agency in the classroom that comprises motivation to learn, self-efficacy beliefs for learning and strategies for intentional and skilful management of new learning in classroom interaction (Illeris, 2009; Pyhältö, Pietarinen, & Soini, 2012). Professional agency in the classroom is a capacity that can be learned over time, starting from the beginning of teacher education (Pyhältö et al., submitted; Soini, Pietarinen, Toom, & Pyhältö, 2015). This dissertation focuses on early-career teachers consisting of teachers who are on their way to becoming experienced professionals, ranging from the beginning of teacher education until the first five years in the teaching profession. However, teaching has been shown to put pressure on early-career teachers especially when they enter the profession and face the realities of working with pupils in the classroom (Cochran-Smith et al., 2012; Eteläpelto, Vähäsantanen, & Hökkä, 2015; Harmsen, Helm-Lorenz, Maulana, & van Veen, 2018; Tynjälä & Heikkinen, 2011; Veenman, 1984; Voss & Kunter, 2019). The negative emotional experiences and perceptions of having inadequate skills to meet the challenges they face in the classroom may impede early-career teachers' capacity to learn and even lead to decreased job satisfaction, burnout and questioning the choice of profession (Chang, 2009; Lindqvst, Weurlander, Wernerson, & Thornberg, 2019; McCarthy, Fitchett, Lambert, & Boyle, 2019; Tiplic, Lejonborg, & Elstad, 2016; Yuan & Lee, 2016). Yet, even if research on early-career teachers is quite extensive, there is a need to gain a better understanding of their professional agency in the classroom, its anatomy and development during teacher education and how it is challenged by teacher-pupil interaction during the first years in the profession.

Teachers' professional agency consists of three components, including motivation to learn, self-efficacy beliefs for learning and strategies for learning. These components are always influenced by the social context (Clarke & Hollingsworth, 2002; Illeris, 2007; Korthagen, 2017). In the classroom, the three components together become realized as contextualized forms of professional agency called the modes of professional agency in the classroom. The concept of teachers' professional agency draws on socio-constructivist and socio-cultural theories of learning (Lasky 2005; Paavola & Hakkarainen, 2005; Pyhältö et al., 2012; Scardamalia, 2002; Scardamalia & Bereiter, 1991). Learning, understood as changes in one's thoughts and/or behaviour, is considered to be a crucial capability of a successful

professional teacher (Illeris, 2007; 2009). Teachers' professional agency refers to a learnable capacity for active, intentional and skilful learning enabling changes that are meaningful for the learner, the community and the learning environment (Pyhältö et al., 2012; Soini et al., 2015). Accordingly, professional agency can be applied as a tool to investigate early-career teachers' active skilful learning that is collaborative in nature.

Classroom interaction constitutes a significant context and source for both the challenges early-career teachers face and the positive learning experiences where they feel capable of actively contributing to pupils' learning and the learning environment (Pennings et al., 2018; Spilt, Koomen, & Thijs, 2011; Veldman, van Tartwijk, Brekelmans, & Wubbels, 2013). Prior studies have indicated that early-career teachers' lack instructional strategies, including recognizing, interpreting and predicting problems in the classroom, that determine classroom situations and whether early-career teachers are able to learn in and from them (Allas, Leijen, & Toom, 2017; Wolff, van den Bogert, Jarodzka, & Boshuizen, 2015). Hence, an aim of this study is to contribute to the literature on early-career teachers' learning by exploring early-career teachers' professional agency in the classroom, further investigating the instructional strategies that early-career teachers apply in classroom interaction and how they determine the suitability of classroom situations for learning professional agency in the classroom.

2 Theoretical framework

2.1 Early-career teachers' professional agency in the class-room

Teachers' active and skilful learning in the classroom is a complex phenomenon that cannot be simplified into or explained by a single behavioural attribute, such as motivation (Pyhältö, Pietarinen, & Soini, 2015). For example, an early-career teacher may obtain a will to learn in the classroom, but if she or he is lacking confidence for learning in the classroom, learning will not take place. Even motivation and self-efficacy beliefs for learning do not guarantee early-career teachers' active learning in the classroom if they have inadequate skills for facilitating new learning in the classroom (Pyhältö et al., submitted). Thus, in this study, the term professional agency in the classroom has been applied as an integrative concept that refers to early-career teachers' capacity enabling active, intentional and skilful management of learning in the classroom (Pietarinen, Pyhältö & Soini, 2016; Pyhältö et al., 2012). Prior studies have shown that teachers' professional agency comprises the interrelated components of motivation to learn (I want), self-efficacy beliefs for learning (I am able) and having and using the strategies for learning (I can and I do) in and from everyday pedagogical practice (e.g. Pyhältö et al., 2015; submitted; Soini et al., 2015; van Eekelen, Vermunt, & Boshuizen, 2006; Wheatley, 2005). Professional agency is suggested to be a key for teachers' active skilful learning (Pyhältö et al., 2015; Toom, Pietarinen, Soini, & Pyhältö, 2017).

Teacher professional agency is based on everyday contexts of teacher's work including classroom interaction (Pietarinen et al., 2016; Soini, Pietarinen, & Pyhältö, 2016; Soini et al., 2015) and the professional community (Pyhältö et al., 2015; Toom et al., 2017). The focus in this dissertation is on early-career teachers' professional agency in the classroom, since the classroom has been shown to comprise a central learning context for teachers and to challenge teachers especially during the first few years in teaching (e.g., Soini, Pyhältö, & Pietarinen, 2010; Spilt et al., 2011; van Eekelen et al., 2006). Teachers' professional agency in the classroom has been shown to contribute to teachers' active and skilful efforts to foster learning individually and together with pupils in classroom interaction and also to promote their own wellbeing (Pietarinen, Pyhältö, Soini, & Salmela-Aro, 2013; Soini et al., 2016). This means that motivation to learn, self-efficacy for learning and strategies for learning determine how teachers' perceive the challenges of everyday classroom interaction, their ability to confront pedagogical situations with an adaptive and transformative approach and the ways they evaluate their effort and competence in the situations. For example, overwhelming teacher-

pupil situations may turn either into destructive friction preventing functional interaction and learning or into constructive opportunities to learn actively from and with pupils (Soini et al., 2016; Vermunt & Verloop, 1999). This may result in either positive cycles affecting teachers' motivation, self-efficacy beliefs and strategies for active skilful learning in the classroom or in negative cycles where they question their abilities to interact with pupils and limit their efforts for learning. Thus, it is crucial that early-career teachers learn professional agency in the classroom from the beginning of teacher education that provides them with various learning environments that may encourage their learning.

Professional agency in the classroom entails motivation, self-efficacy beliefs and strategies for generating and engaging in collaborative learning processes, in which teacher-pupil interaction and peers function as resources for learning (Edwards, 2005; Hakkarainen, Paavola, & Lipponen, 2004; Kwakman, 2003; Pyhältö et al., 2012; Rogoff, Matusov, & White, 1996; Soini et al., 2010; Spilt, et al., 2011). This requires teachers to perceive learning as an integrated part of teaching, including applying open, reflective, reciprocal and adaptive instructional strategies that enable continuous development of pedagogical practice (Martin & Dowson, 2009; van Eekelen et al., 2006). Active, intentional and regulated efforts enhancing learning are not self-evident, but professional agency in the classroom needs to be learned over time. Professional agency in the classroom is not a fixed individual disposition, rather early-career teachers construct it continuously in relation to the surrounding context, actors and their past personal experiences (Emirbayer & Mische, 1998; Greeno, 2006; Soini et al. 2015). Teachers' professional agency in the classroom manifests itself in teachers' actions and aspirations; what is the teacher aiming to do, what and how does she/he consider and regulate in the classroom context. These active, intentional and skilful efforts of learning in classroom interaction are here referred to as modes of professional agency in the classroom. The components of professional agency, including motivation, self-efficacy and strategies for learning, are ingrained in the four modes of early-career teachers' professional agency in the classroom that are presented next (Pyhältö et al., submitted; Soini et al., 2015).

2.1.1 The anatomy of teacher's professional agency in the classroom

The core components of teachers' professional agency in the classroom, including motivation to learn, self-efficacy beliefs for learning and strategies for active proficient learning become realized in the modes of early-career teachers' professional agency in the classroom (Pyhältö et al., submitted; Soini et al., 2015). In other words, these modes represent contextualized forms of teachers' active, intentional and skilful management of learning. The modes of early-career teachers'

professional agency in the classroom are *reflecting in classroom*, *learning by modelling*, *constructing collaborative learning environments* and *developing teaching competence* (Soini et al., 2015). The modes of professional agency vary not only according to contexts such as the classroom or professional community, but may also differ across career phases (e.g., Pietarinen et al, 2016).

Reflecting in classroom

Prior studies have shown that reflection is a central mode of early-career teachers' professional agency in the classroom (Soini et al., 2015; see also, Dunn & Shriner, 1999; Hoekstra, Brekelmans, Beijaard, & Korthagen, 2009; Kwakman, 2003; Lohman, 2006; Lohman & Woolf, 2001; Smaller, 2005; van Eekelen, Boshuizen, & Vermunt, 2005). *Reflecting in classroom* refers to teachers' motivation, self-efficacy beliefs and strategies for learning through active meaning-making of classroom interaction (Toom, Husu, & Patrikainen, 2015; Poom-Valickis & Mathews, 2013). The capacity to reflect in the classroom forms a foundation for teachers' learning and thus is central for early-career teachers' ability to advance teaching actively and skilfully (El-Dib, 2007; Eraut, 2007; Husu, Toom, & Patrikainen, 2008; Lunenberg, Korthagen, & Swennen, 2007; Poom-Valickis & Mathews, 2013; Tilson, Sandretto, & Pratt, 2017). Accordingly, the development of early-career teachers' professional agency in the classroom builds on a reflective stance to teaching-learning situations, which is embodied in their motivation and ability to observe classroom interaction situations analytically and receptively (Barnhart & van Es, 2015; Sherin, Jacobs, & Philipp, 2011). This enables early-career teachers to adopt a proactive stance to pedagogical situations and to enact 'alternative possible trajectories of action' (Emirbayer & Mische, 1998, p. 971) such as by applying and experimenting with modelled novel instructional strategies or by adapting the learning environment according to pupils' learning needs.

Early-career teachers' professional agency in the form of being motivated to, feeling capable of and having and using the strategies for reflecting in the classroom enables them to "see and respond in increasingly informed ways while working in classrooms" (Edwards & Protheroe, 2003, p. 230). For example, when early-career teachers' capacity to reflect on their classroom practices develops, they become more aware of the relational schemas that guide their behaviour in teacher-pupil encounters, they open up to pupils' initiatives and feedback, take pupils' needs into account and they act more professionally by connecting with pupils and by enhancing collaborative learning in the classroom (Claessens et al., 2016; Crichton & Gil, 2015; Fuller & Bown, 1975). Furthermore, it has been suggested that early-career teachers' capacity for reflecting in the classroom promotes their capacity to learn by adapting observed pedagogical practices into one's own teaching (Lunenberg et al., 2007).

Learning by modelling

Learning by modelling entails motivation, self-efficacy beliefs and strategies for learning by observing and analysing other teachers' professional actions. This means seeking new ways of thinking and acting by monitoring the central features and consequences of classroom interaction situations (Barnhart & van Es, 2015; Berliner, 2001; Edwards & Protheroe, 2003). Through intentional observation of a more accomplished teacher or teacher educator, early-career teachers can construct images of what is possible in the classroom and how to transform one's visions of successful teaching and pupil learning into practice (Feiman-Nemser, 2001; Gibbons & Cobb, 2017). Learning by observing and reflecting on the instructional actions of more experienced teachers and peers have been shown to be a highly-valued mode of professional agency in the classroom, especially among early-career teachers (Soini et al., 2015, see also, Grosemans, Boon, Verclairen, Dochy, & Kyndt, 2015; Richter, Kunter, Klusmann, Lüdtke, & Baumert, 2011).

Professional agency in the classroom in the form of active, intentional and skilful learning by modelling other teachers in authentic classroom situations requires motivation, self-efficacy beliefs and strategies for interpreting teachers' thoughts and actions, situated pupil cues and teachers' responses in the given situations (Hagger & McIntyre, 2006; Järvelä, 1998; van Velzen, Volman, Brekelmans, & White, 2012). Furthermore, early-career teachers need to be motivated and able to evaluate and analyse their own visions, beliefs and professional practice, make sense of the observed instructional strategies and endeavour to adapt them as part of their own creation of new teaching-learning situations (Naidoo & Kirch, 2016). That is, motivation and ability to consider and analyse one's own professional practice and make sense of teaching situations, is a prerequisite for a capacity to learn to adapt others' instructional practices into one's own novel pedagogical practice (Eraut, 2007; Lunenberg et al., 2007; Mena, Hennissen, & Loughran, 2017). Professional agency in the classroom enables active skilful learning through observing authentic classroom interaction situations and modelling the practices of peers and more advanced teachers, which has been shown to contribute to early-career teachers' perceived teaching competence (Brown, Lee, & Collins, 2015; Cheng, Cheng, & Tang, 2010; Lieberman & Pointer Mace, 2009; Meirink, Meijer, Verloop, & Bergen, 2009), especially if they have little prior teaching experience (Bandura, 1997; Pfitzner-Eden, 2016).

Constructing collaborative learning environments

Early-career teachers' professional agency in the classroom entails motivation, self-efficacy and strategies for learning by *constructing collaborative learning environments*. It affords them with the ability to adapt instructional actions and the environment intentionally and skilfully in order to promote reciprocal co-learning in the classroom (Soini et al., 2015; 2016). Professional agency in the classroom

encompasses motivation to develop one's own interpersonal skills and to implement them together with pupils in order to coordinate the learning environment responsively (Pyhältö et al., 2012; Rogoff et al., 1996; Sachs, 2000; Soini et al., 2010; Turnbull, 2002, 2005). This requires self-efficacy for active use of co-regulative skills to meet the needs of pupils, to respond to their ideas and to experiment with new pedagogical methods (Evers, Brouwers, & Tomic 2002; Jennings & Greenberg, 2009; Stein & Wang, 1988; Wheatley, 2005).

Professional agency in the classroom in the form of active, intentional and skilful promotion of collaborative learning environments and functional teacher-pupil interaction requires capacity for active reflection in the classroom, including motivation, self-efficacy and strategies for analytic meaning-making of pupils' learning processes (Crichton & Gil, 2015). Successful experiences of learning through constructing functional reciprocal teacher-pupil relationships, enhancing the atmosphere and adapting the environment to meet the needs of all pupils have been shown to contribute to early-career teachers' professional agency, especially in terms of their perceived competence for promoting pupils' learning in the classroom (Beijaard, 1995; Rots, Kelchtermans, & Aelterman, 2012; Spilt et al., 2011). Capacity to learn through creating and facilitating collaborative learning environments in the classroom is a demanding and complex mode of teachers' professional agency in the classroom. Early-career teachers have been shown to experience difficulties in using pupils as a resource for modifying pedagogical practices, responding to their individual learning needs and in constructing supportive engaging learning environments (Bronkhorst, Meijer, Koster, & Vermunt, 2014; Edwards & D'Arcy, 2004; Edwards & Protheroe, 2003; Stürmer, Seidel, & Holzberger, 2016). However, early-career teachers have also shown the ability to facilitate socially and emotionally supportive teacher-pupil interaction, further enhancing their capacity for reciprocal co-regulative learning and well-being in the classroom (Saariaho, Toom, Soini, Pietarinen, & Pyhältö, 2019; Väisänen, 2019).

Developing teaching competence

Competence for promoting pupils' learning entails early-career teachers' motivation, self-efficacy beliefs and strategies for continuous development of instruction within the complex classroom interaction context (Blömeke, Gustafsson, & Shavelson, 2015; Toom, 2017; Pyhältö et al., submitted). *Developing teaching competence* is a central mode of early-career teachers' professional agency in the classroom that allows them to dynamically evaluate, adapt and develop teaching (Soini et al., 2015). It enables early-career teachers to actively learn through their capacity to construct a holistic view of their pedagogical approaches, teaching methods, content taught, pupils' understanding and how these relate to each other in everyday classroom situations. Teaching competence enables early-career teachers to strive longer when facing learning challenges and thus sustains their motivational-affective capacity to learn by experimenting with various strategies

and transforming instructional performance (Holzberger, Philip, & Kunter, 2014; Wolters & Daugherty, 2007).

Competence for promoting learning in the classroom enables early-career teachers to transform instruction according to their thoughts and beliefs about functional pedagogical practice. Such experiences of intentional learning by adapting and applying novel instructional methods have been shown to be significant sources of teachers' self-efficacy beliefs (Bandura, 1997; Evers et al., 2002; Skaalvik & Skaalvik, 2007; Stein & Wang, 1988; Tschannen-Moran & Hoy, 2001; Tschannen-Moran & Johnson, 2011; Wheatley, 2005). Constructing teaching competence in terms of motivation, self-efficacy and strategies for applying and adapting various teaching methods according to both the nature of the content taught and pupils' understanding of it is crucial not only for early-career teachers' future professional development, their well-being and commitment to the profession, but also for the development of pupils' agency (Arnold & Clarke, 2014; Edwards, 2005; Soini et al., 2015). For example, pedagogically adaptive teachers have been shown to use more cognitively activating teaching methods and to provide more support for learning, thus enhancing pupils' motivation to learn (Baumert et al., 2010; Hashweh, 1987; Kunter et al., 2013). Furthermore, early-career teachers who have no experience of active learning by providing and seeking support from others have been shown to be less inclined to facilitate pupils' agency (Edwards, 2005; Lipponen & Kumpulainen, 2011). Taken together, research on early-career teachers' professional agency in the classroom during teacher education is important for developing the structure and content of the teacher education curricula and the pedagogies and assessment methods used in the programs (Shavelson, 2013; Toom, 2017).

2.1.2 Early-career teachers' learning of professional agency

Early-career teachers enter teacher education with various beliefs of what constitutes successful teaching and learning in the classroom that are largely based on previous school experience. The beliefs are resilient to change and can affect early-career teachers' learning of professional agency in the classroom (Calderhead & Robson, 1991; Cheng et al., 2010; Conway, 2001; Kagan, 1992; Lortie, 2002; Ng, Nicholas, & Williams, 2010). Different learning environments that early-career teachers face on their way to becoming experienced professionals may both promote and hinder their learning of professional agency in the classroom (Donche & Van Petegem, 2009; Greeno, 2006; Edwards, 2005; 2007; Lipponen & Kumpulainen, 2011; Toom et al., 2017; Turnbull, 2005). Learning professional agency from the beginning of teacher education is central to becoming motivated and able to analyse and alter pedagogical practices in light of new information (Crichton & Gil, 2015; de Vries, Jansen & van de Grift, 2013; Jennings & Greenberg, 2009; Soini et al., 2015; Turnbull, 2005). Developing motivation,

self-efficacy and strategies for learning in the classroom is a prerequisite for becoming able to alter pedagogical practice according to one's goals actively, intentionally and skilfully.

During teacher education, early-career teachers are expected to acquire a theoretical basis and skills for pedagogical thinking and regulation of learning in the classroom (Donche, Endedijk, & van Daal, 2015; Hagger, Burn, Mutton, & Brindley, 2008; Korthagen, 2010). It has been suggested that undertaking research with peers and more experienced others during teacher education contributes to early-career teachers' professional agency in the classroom by focusing their attention on pupils' learning processes and transformation of pedagogical practices (Hagevik, Aydeniz, & Rowell, 2012; Maaranen, 2009; Santagata & Guarino, 2012; Willegems, Consuegra, Struyven, & Engels, 2017). Furthermore, classroom interaction and practical experiences of teaching are central for learning to respond appropriately to problematic situations, to construct adaptive functional learning environments and to transform instructional practice (Berliner, 2001; Kersting, Givvin, Thompson, Santagata, & Stigler, 2012; Kleinknecht & Schneider, 2013; Sherin et al., 2011). When early-career teachers encounter complex and challenging classroom events, they have opportunities to learn to see more than simple and single solutions for the situations (Mena et al., 2017), thus further building on their motivation, self-efficacy and strategies for learning in the classroom. However, early teaching experiences may also hinder learning of professional agency by promoting actions grounded on prior beliefs of teaching and learning based on experiences as a pupil (Feiman-Nemser & Buchmann, 1986; Donche et al., 2015; Hagger et al., 2008; Korthagen, 2010; Tang, Cheng, & Wong, 2016).

To facilitate early-career teachers' learning of professional agency in the classroom, teacher educators need to make their pedagogical thinking in classroom situations explicit (Hudson, Spooner-Lane, & Murray, 2013; Loughran, 2014). By directing early-career teachers' attention to pupils' learning processes and the central aspects of pedagogical practice, early-career teachers may be able to learn professional agency in terms of becoming motivated and self-efficacious in learning from other teachers (Barnhart & van Es, 2015; Jacobs, Lamb, & Philipp, 2010; Santagata, Zannoni, & Stigler, 2007). This requires providing opportunities for discussing, adapting and enacting the instructional strategies observed in the classroom, which has been suggested to promote early-career teachers' teaching competence (Lieberman & Pointer Mace, 2009; Meirink et al., 2009; Scales et al., 2018; van Velzen et al., 2012). However, prior studies have found a gap between what is learned in the theoretical courses at the campus and what is learned during field experiences (Feiman-Nemser, 2001; Le Cornu & Ewing, 2008; Willegems et al., 2017; Zeichner, 2010; Zeichner, Payne, & Brayko, 2015). It has been suggested that early-career teachers tend to choose the modelled teaching approaches in practice over the theories presented in teacher education (Moore, 2003).

Constructing motivation, self-efficacy and strategies for managing engaging collaborative learning environments and for providing pupils adaptive support, is a key aspect of becoming a professional teacher (Seidel & Shavelson, 2007; Kaendler, Wiedmann, Rummel, & Spada, 2015; Spilt et al., 2011; van de Pol, Volman, Oort, & Beishuizen, 2014). In teacher education, early-career teachers have been shown to improve their skills for promoting collaborative learning especially when they get opportunities to implement it in the classroom (Kaendler et al., 2015; Ruys, Van Keer, & Aelterman, 2011). Also collaborative tasks, assignments and learning environments, in which teacher educators treat early-career teachers as professional agents and responsible colleagues, have been shown to contribute to their professional agency in the classroom (Heikkilä, Lonka, Nieminen, & Niemivirta, 2012; Rigelman & Ruben, 2012; Soini et al., 2015; Toom et al., 2017; Turnbull, 2005; Väisänen, 2019). However, the first teaching experiences may redirect early-career teachers' reflective thoughts towards self and survival and thus inhibit their self-efficacy beliefs and motivation for learning to sensitively adapt and construct functional teacher-pupil interaction (Ng et al., 2010).

Learning experiences that require integrated use of attitudes, knowledge and skills to deal with real-life classroom interaction situations are crucial in early-career teachers' learning of professional agency in the classroom (Darling-Hammond, 2006; Pantić & Wubbels, 2010, 2012; Putnam & Borko, 2000; Struyven & De Meyst, 2010; Toom, 2017). Even if the practice periods in teacher education often focus on learning to conduct and execute lesson plans, they have also been shown to enhance early-career teachers' self-efficacy and abilities to adapt and experiment with instructional practice (Caires, Almeida, & Vieira, 2012; Mattsson, Eilertsen, & Rorrison, 2011; Saariaho, Pyhältö, Toom, Pietarinen, & Soini, 2016). Furthermore, authentic classroom problems integrated into course work can provide early-career teachers with opportunities to relate theory to practice and to test what they know and have already learned and thus enhance learning of professional agency in the classroom (Loyens & Gijbels, 2008; Toom, 2017).

Early-career teachers learn professional agency in the classroom in the various learning environments provided by teacher education, including theoretical courses, research studies and teaching practice periods. These environments facilitate the development of early-career teachers' motivation, self-efficacy beliefs and strategies for learning in the form of the four contextualized modes of professional agency in the classroom. These modes of professional agency in the classroom are deeply interrelated and affect the learning of each other, yet they may also develop separately (Blömeke & Kaiser, 2017; Soini et al., 2015; Pyhältö et al., submitted). For example, an early-career teacher may have motivation, self-efficacy beliefs and required strategies for reflecting in classroom situations, yet still struggle in constructing collaborative learning environments, or vice versa

(Desimone, 2009; Guskey, 1986; 2002; Opfer & Pedder, 2011). Thus, the development of professional agency in the classroom may not be a linear process but could rather be considered to be a complex and dynamic ongoing process that needs to be promoted in the multiple learning environments of teacher education and during the first years in teaching profession (e.g., Boshuizen, 2004; Endedijk, Vermunt, Meijer, & Brekelmans, 2014).

2.2 Teachers' instructional strategies in classroom interaction

Teachers use a wide variety of instructional strategies for orchestrating functional interaction and the course of teaching-learning events to promote pupils' learning and to facilitate possibilities for their own learning in the classroom. Instructional strategies refer to the means teachers use to manage classroom interaction situations (Edwards & Protheroe, 2003; Sutton, Mudrey-Camino, & Knight 2009; van Tartwijk, den Brok, Veldman, & Wubbels, 2009). Thus, they are crucial in determining the classroom interaction situations in which early-career teachers may have opportunities to learn professional agency in the classroom. Accordingly, instructional strategies indicate what early-career teachers already know and can do to facilitate classroom interaction that promotes learning for all. Previous studies have shown that highly capable teachers apply instructional strategies that exhibit attentiveness towards pupils' needs and actions, precise interpretations of classroom situations and adaptiveness in instructional practices (Blömeke et al., 2015; Hattie, 2003; Santagata & Yeh, 2016). Such anticipative, reflective, responsive and context-sensitive actions may create time and space for teachers to learn professional agency in the classroom by allowing them to adapt and develop their pedagogical practice and the learning environment (Edwards & Protheroe, 2003; Hagger et al., 2008). Moreover, teachers' professional agency in the classroom may regulate their use of instructional strategies, since teachers who are motivated to learn and have self-efficacy and strategies for learning in the classroom are more likely to perceive novel classroom situations as opportunities to learn instead of threats (Soini et al., 2016).

Not all instructional strategies are open, adaptive or experimental, yet they may still be functional for orchestrating positive teacher-pupil interaction that further supports active learning in the classroom (Eraut 2002; Jennings & Greenberg, 2009; Manning & Payne, 1993; Pennings et al., 2018; Soini et al., 2010). An extensive repertoire of instructional strategies enables teachers to interact more professionally with pupils, thus positively affecting the classroom learning environment, teacher-pupil relationships, pupils' learning and thus promoting situations suitable for learning professional agency in the classroom (Brackett, Palomera, Mojsa-Kaja, Reyes, & Salovey, 2010; Lopes, Salovey, Côté, Beers, & Petty, 2005; Martin & Dowson, 2009; Mega, Ronconi, & De Beni, 2014; Pekrun, Goetz, Tizt,

& Perry, 2002; Spilt et al., 2011; Veldman et al., 2013). Early-career teachers learn instructional strategies in teacher education and throughout their professional careers, but due to the complexities of classroom interaction they may not always be able to use a functional strategy (Pennings et al., 2018; Brekelmans, Wubbels, & van Tartwijk, 2005). Early-career teachers have also shown to lack high-quality strategies needed for successful regulation of classroom interaction and a tendency to focus on their own actions rather than on pupils in the authentic classroom situations during teacher education (Allas et al., 2017; Claessens et al. 2016; de Jong, van Tartwijk, Wubbels, Veldman, & Verloop, 2013; Fuller & Bown 1975; Wolff et al., 2015). However, learning professional agency in the classroom provides early-career teachers with motivation, self-efficacy and strategies for reflecting on pedagogical practices and pupils' learning needs, which may also promote use of functional instructional strategies.

It has been shown that early-career teachers still struggle with the complexities of classroom interaction during their first years in the profession (e.g., Le Maistre & Pare, 2010). For example, it has been shown that they interpret and analyse classroom events less effectively and deeply than experienced teachers (Borko & Livingston, 1989; Wolff et al., 2015), which may limit their abilities to facilitate situations that would allow learning of professional agency in the classroom. Inadequate strategies for responding to unexpected classroom events may cause feelings of frustration, uncertainty or inadequacy, especially when they interfere with early-career teaches' carefully constructed script of the lesson (Mattsson, Eilertsen, & Rorrison, 2011). Accordingly, dysfunctional instructional strategies may facilitate unpleasant learning situations that increase early-career teachers' perceptions of having inadequate skills in teacher-pupil interaction, which may further reduce early-career teachers' professional agency in the classroom. Together these may create a negative cycle that again promotes dysfunctional self-centred instructional strategies.

Since instructional strategies may determine the suitability of classroom situations for learning professional agency in the classroom, it is reasonable to elaborate on their qualities. Instructional strategies that early-career teachers use in classroom interaction situations may capitalize on cognitive, behavioural or emotional processes (e.g., Clark & Peterson, 1986; Emmer & Stough, 2001). *Cognitive strategies* consist of early-career teachers' thought processes in managing classroom interaction situations. They include monitoring pupils, analysing pedagogical practice and pupils' actions, modifying plans and setting novel goals (Bengtsson, 1995; Schön, 1983; Sherin et al., 2011). *Behavioural strategies* entail early-career teachers' behavioural activities in managing classroom interaction. Teachers apply multiple performing means that initiate, modify and prevent classroom events, including expressing rules and expectations. In general, successful teacher behaviour facilitates simultaneous establishment of good rapport and high control

(van Tartwijk et al., 2009; Wubbels, 2011). *Emotional strategies* modify the effects of the emotions experienced by early-career teachers (Pekrun, 2006). Emotional strategies include identifying the emotion, regulating it by inducing, altering or preventing it or using the emotion to incite goal-directed actions (Matthews, Zeidner, & Roberts 2004). An emotion can be either up- or down-regulated, referring to increasing or decreasing its duration and intensity (e.g., Jiang, Vauras, Volet, & Wang, 2016; Sutton et al., 2009). Down-regulation is more common among teachers, and they have been shown to perceive highly intense emotions, either positive or negative, as a threat to their sense of control (Aultman, Williams-Johnson, & Schutz 2009; Jiang et al. 2016). Instructional strategies often appear in intricate combinations of intertwined strategies (Carver & Scheier, 1990; Kurki, Järvenoja, Järvelä, & Mykkänen, 2016). For example, regulating one's emotions (emotional) may be followed by reappraising (cognitive) or walking away from the situation (behavioural). Prior studies have indicated that one strategy may dominate the use of others (e.g., Clark & Peterson, 1986; Sutton et al., 2009). Teachers require a wide repertoire of instructional strategies to facilitate functional classroom interaction and to promote opportunities for both pupils' learning and teachers' learning of professional agency in the classroom.

Early-career teachers' cognitive, behavioural and emotional instructional strategies vary in how reactive or proactive they are (Eraut, 2002; Manning & Payne, 1993). Proactive strategies refer to early-career teachers' anticipating efforts to manage classroom interaction (Aspinwall & Taylor, 1997). They include early-career teachers' initiatives to enhance pupils' learning, to prevent misunderstandings and misbehaviour and to construct optimal atmosphere and functional teacher-pupil relationships. *Proactive strategies* have a positive and future-oriented approach to dealing with difficult classroom situations (Clunies-Ross, Little, & Kienhuis, 2008; Greenglass & Fiksenbaum, 2009). Thus, they may allow early-career teachers to see situations as opportunities to learn professional agency in the classroom. Classroom interaction situations require also quick reactions from the teacher (Manning & Payne, 1993). *Reactive strategies* refer to teachers' immediate, automatic and spontaneous responses to classroom events, such as difficult questions or pupils' off-task behaviour. These reactions have not been consciously planned, they tend to be unconsidered and emotionally driven and thus concentrate on the present moment instead of future classroom events or broader objectives (Eraut, 2002; Manning & Payne, 1993). Since reactive strategies do not entail forethought or justification, they are dependent on early-career teachers' practical knowledge based on prior experiences rather than on novel situational information (Eraut, 2002). Thus, reactive strategies tend to lack situational sensitiveness, which may hinder early-career teachers from seeing the situation as an opportunity for learning professional agency in the classroom and instead promote perceptions of inadequacy in teacher-pupil interaction.

2.3 Early experiences of teaching

Teacher education and the first years in teaching comprise a critical phase in a teacher's career and for their professional agency, since the first experiences of teaching in a classroom may either encourage or inhibit a teacher's engagement in their own learning and commitment to the teaching profession. Thus, the focus of this study is on early-career teachers as a group of teachers with experience ranging from the beginning of teacher education until five years of working in schools (e.g., Hong, 2012; Lindqvist, Nordanger, & Carlsson, 2014). There is evidence that a number of early-career teachers experience challenges, concerns and tensions related to becoming a teacher, entering the profession and continuing to learn in the classroom context (e.g., Hong, Day, & Greene, 2018; Kagan, 1992; McCormack, Gore, & Thomas, 2006; Pillen et al., 2013; Tynjälä & Heikkinen, 2011; Veenman, 1984; Wideen, Mayer-Smith, & Moon, 1998). Early-career teachers experience discrepancies between their own conceptions of successful teaching and the fast pace, complexity and emotionality of working in the classroom, which may hinder their professional agency by distracting their vision of how to reach their goals in classroom practice (Fantilli & McDougall, 2009; Veenman, 1984; Wideen et al, 1998). However, early-career teachers have also been able to transform difficult situations into positive experiences and even into learning, further promoting their commitment to the teaching profession (Hong et al., 2018; Meijer, de Graaf, & Meirink, 2011; van der Wal, Oolbekkink-Marchand, Schaap, & Meijer, 2019). For example, there is evidence that accomplishments in pedagogically and socially challenging situations with pupils, and in creating and sustaining positive functional relationships with pupils, increase early-career teachers' motivation, self-efficacy, work engagement, job satisfaction, wellbeing, commitment to the profession and willingness to learn (Fransson & Frelin, 2016; Grayson & Alvarez, 2008; Jennings & Greenberg, 2009; Jo, 2014; Soini et al., 2010; Spilt et al., 2011). Thus, learning functional instructional strategies during the first years in teacher education is crucial in promoting early-career teachers' opportunities for learning professional agency in the classroom, including actively constructing collaborative learning environments together with pupils.

Early-career teachers' attributions of challenging classroom situations with pupils may vary from learning options to inevitable conflicts, which further affects their professional agency in the classroom (De Vries et al., 2013; Hoekstra et al., 2009; Soini et al., 2010). Teachers with high self-efficacy tend to see problems with pupils as learning opportunities and invest their effort in solving them, whereas teachers with weaker self-efficacy may perceive themselves as being helpless or inadequate, which decreases their sense of accomplishment and level of engagement (Aloe, Amo, & Shanahan, 2014; Hong, 2012; Jerusalem & Schwarzer, 1992; Lauermann & König, 2016; Schwarzer & Hallum, 2008). The demanding and complex nature of teaching combined with a low sense of control may result in extensive stress and reduce early-career teachers' professional

agency in the classroom (Caspersen & Raaen, 2014; Lindqvist, Weurlander, Wernerson, & Thornberg, 2017; Hatlevik, 2017). Accordingly, motivation, self-efficacy and strategies for learning not only determine early-career teachers' capacity for active, intentional and skilful learning, but also regulate their efforts to manage classroom interaction through instructional strategies, which may again either promote or hinder suitable classroom situations for learning professional agency.

Teacher-pupil interaction constitutes the central arena not only for motivationally and affectively empowering learning experiences that increase early-career teachers' professional agency, but also for the draining experiences related to their learning (Hargreaves, 2000; Soini et al., 2010; Spilt et al., 2011; van Eekelen et al., 2006). *Inadequacy in teacher-pupil interaction* refers to teachers' perceptions of having inadequate competence in problematic situations with pupils. Early-career teachers may experience constant disappointments in challenging classroom interaction situations and perceive having inadequate skills to regulate pupils' learning, a phenomenon widely identified in prior research comparing early-career teachers and more experienced teachers (Berliner, 1986; Borko & Livingston, 1989; Leinhardt & Greeno, 1986; Wolff et al., 2015). If disappointing experiences of lacking the skills to promote functional classroom interaction are not balanced with experiences of constructing successful opportunities for learning professional agency, they may reduce teachers' motivation, job satisfaction and commitment to the teaching profession (Struyven & Vanthournout, 2014; Pfitzner-Eden, 2016; Veldman, Admiraal, van Tartwijk, Mainhard, & Wubbels, 2016). Accordingly, experiencing inadequacy in teacher-pupil interaction may deter early-career teachers' learning of professional agency in the classroom.

Turnover intention refers to an early-career teacher's inclination and willingness to change their profession (Pomaki, DeLongis, Frey, Short, & Woehrle, 2010). Turnover intention has been shown to predict actual turnover (Griffeth, Hom, & Gaertner, 2000). In this study, turnover intention is considered to be a process that may arise, fade away or intensify during teacher education or during the first few years in the profession, affect early-career teachers' efforts and effectiveness in the classroom and ultimately lead to leaving the profession (Hong, 2010; Lanas, 2017). Turnover intention indicates the value that early-career teachers perceive in the teaching profession and what it has to offer, thus affecting their experiences and attributions in teacher-pupil situations and their professional agency in the classroom (Pekrun, 2006). Thus, turnover intention may cause imbalance in how early-career teachers perceive their competence and skills related to both learning in the classroom and in promoting functional teacher-pupil interaction. Furthermore, turnover intention is positively related to job stress and negatively related to job satisfaction, commitment to teaching, and resilience (e.g., Day, Sammons, Gu, Kington, & Stobart, 2009; Klassen & Chiu, 2011; Martin, Sass & Schmitt, 2012). Accordingly, early-career teachers' turnover intention is

unsupportive for learning professional agency; they may emphasize and bring forth experiences of having inadequate skills in teacher-pupil interaction and they may even lead to leaving the teaching profession.

Teachers leaving the profession as a personal choice, referred to as teacher turnover, is a problem concerning especially early-career teachers in many western societies (Borman & Dowling, 2008; Guarino, Santibanez & Daley, 2006; Heikkinen, Jokinen, & Tynjälä, 2012; Scheopner, 2010; Struyven & Vanthournout, 2014; Wang, Hall, & Rahimi, 2015). In Finland, estimations have been presented that 10-20 per cent of graduating primary school teachers leave the teaching profession during the first five years (Nissinen & Välijärvi, 2011). Furthermore, it has been shown that 20 per cent of Finnish comprehensive school teachers have considered changing to another profession (Jokinen et al., 2013). Cultural, societal, political and economic factors such as support structures, respect towards the profession, school leadership and teacher collaboration may explain the differences between countries (Darling-Hammond & Rothman, 2011; Heikkinen et al., 2012). It has been shown that salary, teacher and pupil demographics, working conditions, perceived wellbeing and intrinsic rewards are significant factors in early-career teachers' decisions to leave or stay in the teaching profession (Borman & Dowling, 2008: Guarino et al., 2006; Scheopner, 2010). For example, there is evidence that high workloads, unsupportive school leadership and lack of job satisfaction in terms of teacher-pupil relationships are related to early-career teacher turnover (Kyriacou & Kunc, 2007; Sruyven & Vanthournout, 2014). Even if early-career teacher turnover rates in Finland are not as extreme as in some countries, considering leaving the teaching profession is not rare and its effect on early-career teachers' professional agency and experiences in classroom interaction ought to be considered.

2.4 Summary of the theoretical framework

The aim with this dissertation is to enhance understanding of early-career teachers' active, intentional and skilful learning in classroom interaction. Since such learning cannot be simplified to or explained with a single attribute, the concept of professional agency in the classroom has been applied in this study. Professional agency in the classroom is an integrative concept covering the interrelated motivational-affective, intellectual and behavioural components required for active skilful learning, including motivation to learn, self-efficacy for learning and strategies for learning (e.g. Pyhältö et al., 2015). These core components (i.e., I want, I am able to and I do) become realized in the contextualized modes of professional agency in the classroom, including reflecting in classroom, learning by modelling, constructing collaborative learning environment and developing teaching competence (see Figure 1) (Pyhältö et al., submitted; Soini et al., 2015). Learning is at the core of all these modes; thus they entail early-career teachers' capacity

to change their thoughts or behaviours related to promoting pupils' learning and functional learning environments in the classroom. Professional agency in the classroom is a malleable capacity that can be learned in the various environments provided in teacher education and throughout teachers' careers.
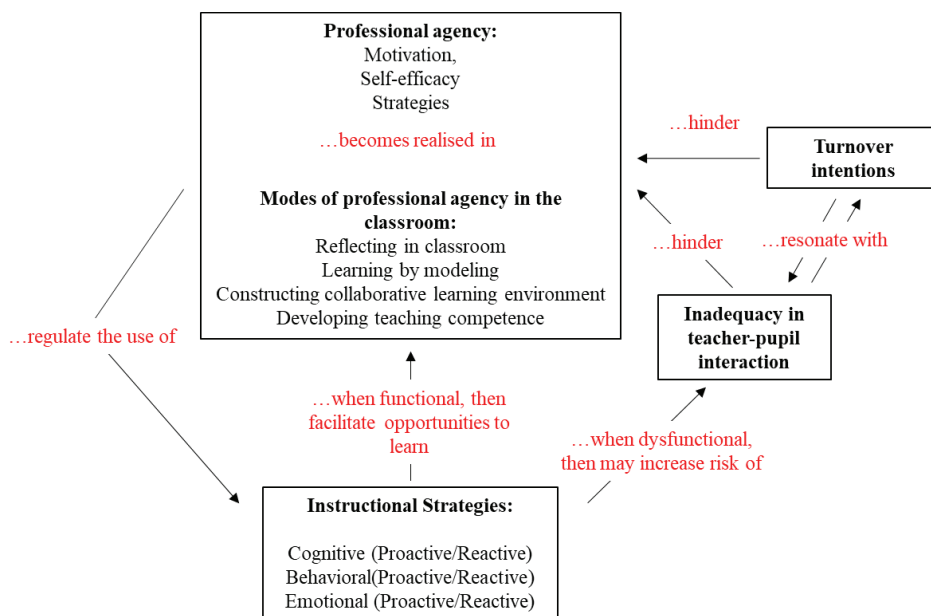
Figure 1. The regulators and development of the early-career teachers' professional agency in the classroom.

Early-career teachers' professional agency in the classroom is particularly vulnerable during the first few years of working as a teacher. Teacher-pupil interaction is a novel and challenging learning environment for early-career teachers and provides the context not only for positive experiences of enacting professional agency in the classroom, but also for the negative experiences and perceptions of inadequate skills for orchestrating classroom interaction. The high number of teachers experiencing symptoms of burnout and leaving the teaching profession during the first few years is a concern identified internationally (den Brok, Wubbels, & Tartwijk, 2017; Hong, 2010; Lanas, 2017; Lindqvist et al., 2014; Wang et al., 2015). Also, in Finland, early-career teachers perceive the first years as burdensome and many have considered leaving the profession. These turnover intentions may disappear or arise during teacher education and the first few years in the profession, yet when present, they may affect early-career teachers' professional agency in the classroom.

Teachers need various instructional strategies to manage successful classroom interaction situations, which creates a basis for functional teacher-pupil relationships and optimal learning environments. Thus, instructional strategies are central

in determining classroom situations that may either promote or hinder both pupils' learning and early-career teachers' opportunities to enact professional agency in the classroom. For example, instructional strategies that are responsive and attentive to pupils' needs, initiatives and actions may provide early-career teachers not only with positive experiences of controlling and producing positive teacher-pupil interaction, but also with opportunities to adapt their pedagogical practice according to situational comprehension (Blömeke et al., 2015; Hattie, 2003; Jennings & Greenberg, 2009). In sum, this dissertation explores early-career teachers' professional agency in the classroom, how it is related to the inadequacy they experience in teacher-pupil interaction and turnover intentions during the first few years in teaching, its development during teacher education and instructional strategies that early-career teacher apply in the classroom during teaching practicums. In the empirical parts of the thesis, sense of professional agency in the classroom is used interchangeably with professional agency in the classroom, to emphasize the self-report nature of the data.

3 The aim of the study

The aim of this study is to investigate the anatomy of early-career teachers' professional agency in the classroom, how it is related to challenges experienced in teacher-pupil interaction during their first few years in the profession, and further, how the strategies that early-career teachers use in classroom interaction during teaching practicums determine classroom situations and their appropriateness for learning professional agency in the classroom. The following research questions are addressed:

1. How is early-career teachers' sense of professional agency in the classroom related to perceived inadequacy in teacher-pupil interaction and turnover intentions during the first few years in the profession?
2. How do the modes of early-career teachers' sense of professional agency in the classroom develop during teacher education?
3. What kind of strategies do early-career teachers use in classroom interaction during teaching practicums?

To approach the research questions, three studies with more specific hypotheses or research questions were conducted. The first study applied cross-sectional quantitative survey data to explore early-career teachers' sense of professional agency in the classroom and how it is related to inadequacy experienced in teacher-pupil interaction and turnover intentions during the first few years in the teaching profession. The second study relied on longitudinal questionnaire data and quantitative methods to explore the interrelationships between the modes of early-career teachers' sense of professional agency in the classroom during the first three years of teacher education. The third study used qualitative interview data to deepen the understanding of the strategies that early-career teachers use in classroom interaction and how they determine classroom situations during teaching practicums.

4 Methods

This doctoral dissertation drew on a pragmatist approach in which the phenomenon that was explored determined the research methods (Creswell & Plano Clark, 2018; Johnson, Onwuegbuzie & Turner, 2007; Teddlie & Tashakkori, 2003). It was carried out as a mixed-method study that aimed to investigate different yet overlapping features of early-career teachers' professional agency in the classroom to yield an extensive, enriched and elaborated understanding of the phenomena (Bryman, 2006; Creswell & Plano Clark, 2018; Greene, Caracelli & Graham, 1989; Johnson et al., 2007). A convergent design was applied in this dissertation by conducting quantitative and qualitative data collections and analyses concurrently but separately and by merging the results together into a larger understanding presented in this dissertation (Creswell & Plano Clark, 2018). *Study I* and *Study II* were quantitative. *Study III* utilized qualitative data and methods.

4.1 Research contexts

This research was conducted in two primary environments of teachers' learning: the comprehensive school (*Study I*) and teacher education (*Study II* and *Study III*). Finnish comprehensive schooling (grades 1-9) is publicly funded and the aim is to provide equal basic education for everyone (Finnish National Agency for Education, 2017). No separation of pupils into academic or vocational studies is made during the years at comprehensive school. The aim with the accountability processes is to preserve trust in individual schools (Toom & Husu, 2012). Education in general and the teacher's work are highly valued in Finland. All teachers must have a five-year university master's degree. They work autonomously and have responsibility and freedom to plan, execute and develop their teaching, make pedagogical decisions and conduct pupil assessments within the limits of the national curriculum. Furthermore, they take part in developing the local and school curriculums. Also, Finnish universities are funded by the government. Early-career teachers are a highly-selected group of university students. For example, less than 11 per cent of applicants are accepted into primary school teacher education programs across the country (VAKAVA, 2017).

Finnish primary school teachers typically teach grades 1-6. They complete a master's degree in education that is provided by eight of Finland's universities. It consists of 300 European Credit Transfer and Accumulation System credits (ECTS, see European Commission, 2014) and is usually completed in five years. The teacher education curriculum includes orientation (25 ECTS), main subject studies in education or educational psychology (140 ECTS), compulsory minor subject (60 ECTS) and optional study (75 ECTS). Three student teaching periods

(totalling 20 ECTS) are spread out across the main subject studies that also include writing a bachelor's and a master's degree thesis. Practice periods are completed in pairs, including collaborative planning of the lessons and taking turns as the responsible teacher in the classroom. Secondary teachers typically teach grades 7-9. They study towards a master's degree in their subject domain, such as English or mathematics, and one academic year of pedagogical studies in education (60 ECTS) including teaching practice (20 ECTS). Secondary teachers can also teach in upper-secondary schools once they have received their teacher qualification. Special education teachers study a university master's degree in special education, and they teach grades 1-9. Finnish teacher education is research-based and the aim is to produce autonomous reflective thinkers who approach their pedagogical practice in an inquiring manner (e.g., Toom et al., 2010).

4.2 Participants

In this dissertation, early-career teacher refers to teachers on their way to becoming experienced professionals starting at the beginning of their teacher education study and lasting until they have gained more than five years' experience in the teaching profession. The data used in this doctoral study were collected from three cohorts of early-career teachers representing different phases of that journey: at the beginning of their teaching career, at the beginning of teacher education and at the end of the teacher education. Cohort I consisted of N = 284 comprehensive school teachers (255 females, 28 males; mean age 32.5, SD 4.47) with five or fewer years of experience in teaching (M = 4.04, SD = .96, min/max = 1/5). The cohort included primary (n = 74; 26%), secondary (n = 78; 27%) and special education teachers (n = 132; 46%). All participants had a master of Arts degree. It was taken from a national sample of 2310 comprehensive school teachers that was collected with a random sampling method (Pietarinen et al., 2013). The national sample represented the teacher population in Finland well, although females were slightly over-represented (Pietarinen et al., 2013). The data collected from comprehensive school teachers during the first five years in teaching profession were applied in *Study I*.

Cohort II consisted of early-career teachers from primary school teacher education programs at three Finnish research-intensive universities. They were followed from the beginning of their studying until the end of their bachelor's degree phase. The sample comprised N = 268 early-career teachers (209 females, 59 males; mean age 23.93, SD 5.05) who participated in a longitudinal survey study. They were chosen based on having started simultaneously in a five-year master's degree teacher education program and answering a questionnaire in the first academic year (response rate 82%). The measures were then repeated annually, and 59 per cent of them answered the questionnaire in the second year and 64 per cent participated in the third year of their teacher education. A total of 125 early-career

teachers responded in all three repeated measures. Participants at each point of measurement represented the student population within the three teacher education programs. Most of the participants had none or minimal teaching experience and no prior degrees. Re-participation was related to gender and age as female teachers in the second year and older teachers in the third year were slightly more likely to be absent. However, there were no statistically significant differences between the answers of the early-career teachers who participated in every measurement and the ones who did not. The longitudinal survey data collected from early-career teachers during their bachelor's degree studies were utilized in *Study II*.

The participants in cohort III included N = 31 early-career teachers (26 females, 5 males; mean age 26.03 years, SD 4.16) who were selected because they were at least half way through their teacher education at the University of Helsinki and attending in a major or final teaching practicum. They were studying to become primary school teachers (25) and secondary school teachers (6). The participants studying to become primary school teachers studied either educational science or educational psychology as their major subject, whereas early-career teachers studying to become secondary teachers studied either biology or geography as their major subject. The participants sufficiently represented the student population at the teacher education institute in terms of sex and age. The data collected from early-career teachers during their major or final teaching practicum were used in *Study III*.

All participants were informed about the research before data collection, participation was voluntary, and no compensation was provided. The participants could withdraw from the study at any point of the research process. Permission to undertake the research was received from the early-career teachers, deans and directors of the teacher education institutes, supervising teachers, and pupils' parents according to the official guidelines of the Finnish Advisory Board of Research Integrity (2013). Pertinent information about the participants has been presented in the study without compromising their anonymity.

4.3 Materials

In this dissertation, three data sets were utilized. Two questionnaires were used in the data collections in order to explore early-career teachers' sense of professional agency in the classroom during the first years in the profession (Pietarinen et al., 2016; Pyhältö et al., 2015; Soini et al., 2016) and during teacher education (Soini et al., 2015; Toom et al., 2017). Scales that measure early-career teachers' sense of professional agency, especially in the classroom interaction context (Pietarinen et al., 2016; Soini et al., 2016; 2015), and the factors related to it during the first few years in the profession (Pietarinen et al., 2013; Soini et al., 2016), were utilized in this study and are presented below. Furthermore, stimulated recall (STR)

interviews embedded in the *Procedure of guided reflection* (Husu et al., 2008; Leijen et al., 2014; Toom et al., 2015) were applied to get a deeper understanding of the instructional strategies that early-career teachers use in classroom interaction situations during teaching practicums.

4.3.1 Survey data

The *Teachers' professional agency* (TPA) survey was developed to examine teachers' active, intentional and skilful learning and well-being within the different contexts of school work, including the classroom and the professional community (Pietarinen et al., 2016; Pyhältö et al., 2015; Soini et al., 2016). The focus in this dissertation was on the classroom interaction context, since it is the central arena of teaching and learning and experienced challenges related to the first few years of working as a teacher. A *Teachers' professional agency in the classroom* scale was used to measure the central interrelated constituents of teachers' sense of professional agency in the classroom, including motivation to learn, self-efficacy beliefs for learning and strategies for enhancing and facilitating learning in classroom interaction (Edwards, 2005; Pietarinen et al, 2016; Sachs, 2000; Soini et al., 2016; Turnbull, 2002, 2005). These core components of sense of professional agency were embedded in the two contextualized modes of early-career teachers' sense of professional agency in the classroom: *Reflection in the classroom* (REF, four items) measured early-career teachers' ability to analyse and consider their professional practice and teaching situations, and *Collaborative learning and transformative practice* (CLE, six items) measured their capacity to build functional interaction with pupils and adapt the learning environment to yield co-learning (Pietarinen et al., 2016; Soini et al., 2016).

The *Inadequacy in teacher-pupil interaction* scale consisted of three items that measured early-career teachers' perceptions of having inadequate ability to deal with problematic encounters with pupils. The scale was part of the *Socio-contextual teacher burnout* scale (Pietarinen et al., 2013; Soini et al., 2016) that had been modified from Maslach and Jackson's (1981) burnout scale. Early-career teachers' *turnover intentions* were measured with one item that asked if they had considered changing the teaching profession (yes or no; see for example, Goddard & Goddard, 2006). Furthermore, *work experience* (indicated in years) was used not only in choosing the participants, but also in controlling and exploring its effects on professional agency in the classroom and perceived inadequacy in teacher-pupil interaction. The items and Cronbach's alphas for the seven-point Likert scales are presented in Appendix A. *Teacher professional agency in the classroom scale*, *Inadequacy in teacher-pupil interaction* scale and *turnover intentions* were used in *Study I*.

The *Student Teachers' Sense of Professional Agency* (STPA) survey (Soini et al., 2015; Toom et al., 2017) was used to collect longitudinal data from early-

career teachers in 2013, 2014 and 2015. It was modified from the TPA survey and pilot tested in another teacher education institute before the actual data collection (Soini et al., 2015). This dissertation applied *Student teachers' professional agency in the classroom* scale (Soini et al., 2015) that was adjusted for teacher education environment with complementary items that were based on prior research on early-career teachers' agency beliefs (Malmberg & Hagger, 2009), teachers' efficacy (Friedman & Kass, 2002; Tschannen-Moran & Hoy, 2001) and teachers' learning (Darling-Hammond & McLaughlin, 1995). The *Student teachers' professional agency in the classroom* scale comprised 20 items that measure the four modes of early-career teachers' sense of professional agency in the classroom: *Reflection in classroom* (REF) (five items), *Modeling* (MOD) (two items), *Collaborative learning environment* (CLE) (eight items) and *Competence* (COM) (five items) (Soini et al., 2015). The seven-point Likert scale was used in *Study II* to explore longitudinally the anatomy of early-career teachers' sense of professional agency in the classroom during the first three years in teacher education. Cronbach's alphas consistently showed sufficient reliability for Reflection in classroom (REF) and good reliability for all the other factors (see Appendix B).

4.3.2 Stimulated recall interview data

To explore the strategies that early-career teachers use in classroom interaction situations during the teaching practicum at the end of their teacher education, stimulated recall (STR) interview data were collected by applying the *Procedure of guided reflection* (Husu et al., 2008; Leijen et al., 2014; Toom et al., 2015). The procedure included video-recorded lessons and thoughtful deliberation of critical situations in the STR interviews that were collected during the second phase of the guided reflection (see Figure 2) (Bloom, 1953; Calderhead, 1981; Lyle, 2003; Tripp, 1993). Focusing on classroom events that were perceived to be meaningful and chosen by the participants provided significant information on early-career teachers' strategies in the authentic pedagogical context provided by the teaching practicum setting (Husu et al., 2008).

The procedure involved the participants selecting one of their forthcoming lessons to be video recorded, receiving the recorded lesson to be viewed at home and the STR interview was carried out within the next four days. Early-career teachers were asked to choose two critical situations when watching the recorded lesson: one empowering, including a situation that they experienced as being successful and one as being challenging, consisting of an episode that they perceived as difficult. In the STR interview, the situations were watched together to stimulate and bring forth early-career teachers' thoughts during the classroom situations and to focus the interview on the actual events (Vesterinen, Toom, & Krogfors, 2014). The interview questions concentrated on the participant's behaviour and thoughts, pupils' behaviour and the interaction between them during the selected situations.

However, STR interview data typically include interviewees' general thoughts and visions on teaching and learning as well as various ideas that come up while screening and discussing the video (Lyle, 2003). The STR interviews took approximately 20 minutes per early-career teacher. The data used in *Study III* included 29 empowering and 34 challenging situations.
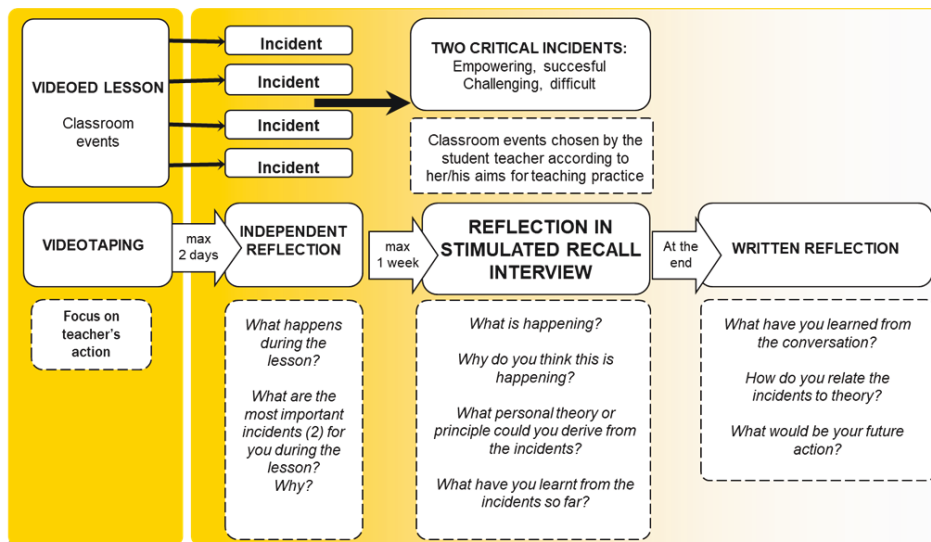
Figure 2. The procedure of guided reflection (Husu et al., 2008; Leijen et al., 2014; Toom et al., 2015).

4.4 Analyses

The quantitative survey data sets were analysed using variable oriented methods. Structural equation modelling (SEM) was applied to examine the anatomy of sense of professional agency in the classroom, its development in time and its relation to other factors of interest. The STR interview data were examined by means of qualitative content analysis utilizing abductive strategy. It was considered that the abductive strategy deepened our understanding of the strategies early-career teachers use in classroom interaction context and was in line with the pragmatic approach of the study (Tavory & Timmermans, 2014).

4.4.1 Quantitative analyses

In *Study I*, to get acquainted with the data set and continue to more advanced statistical methods, descriptive statistics, zero-order correlations, missing value patterns and reliability measures were explored using SPSS software. The variables that were used included less than two per cent of missing values and they were missing completely at random according to Little's MCAR test ($\chi 2=103.17$, $p=.08$). The relations between early-career teachers' sense of professional agency

in the classroom, experiences of insufficient capacity to deal with problematic encounters with pupils and turnover intentions at the beginning of teaching career were analysed by means of SEM. It allowed the simultaneous examination of multiple relationships that were based on a priori specifications, provided and applied explicit estimates of error variance parameters and enabled the use of both observed and unobserved (i.e. latent) variables in modelling multivariate relations (Byrne, 2012; Kline, 2015; Ullman, 2014). Hence, SEM allowed inclusion of sense of professional agency in the classroom as a latent variable (i.e. an unobservable factor measured with multiple items) and exploration of how it is related to other latent and observed variables.

The analyses in *Study II* were also conducted in two phases. Again, the preliminary analyses showed that there were less than two per cent of missing data missing completely at random (MCAR: $\chi2$=976.40, p=.16). Because of the longitudinal data set, the development of the scale means were explored by comparing the repeated measures with Friedman's nonparametric tests and Wilcoxson nonparametric tests. Friedman's test was used as the nonparametric option for the one-way analysis of variance for repeated measures of continuous variables that deviate from normal distribution. In order to explore between the measures for which change actually existed, Wilcoxson signed-rank tests were used as post hoc tests. To counteract the type one error related to multiple comparisons, Bonferroni correction was used. In the primary analysis of *Study II*, SEM was used to examine the internal dynamics of sense of professional agency in the classroom and how they develop over time in teacher education. SEM made it possible to examine the anatomy of early-career teachers' sense of professional agency in the classroom longitudinally by including its four modes as observed mean variables measured at three time points in one longitudinal path model.

The SEM analyses used in *Study I* and *Study II* statistically determined the extent to which the hypothetical model was consistent with the data set in question (Muthén & Muthén, 1998–2012). Because of the non-normality of both data sets, a robust maximum likelihood estimation procedure (MLR) was utilized. The goodness-of-fit of the estimated standardized models were tested with chi square test ($\chi2$), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA) (Hu & Bentler, 1999). The SEM analyses were conducted with Mplus software (Muthén & Muthén, 1998–2012).

4.4.2 Qualitative content analysis

A qualitative content analysis following abductive strategy (Chamberlain, 2006; Timmermans & Tavory, 2012) was conducted to investigate the qualities of the strategies early-career teachers applied in classroom interaction during the teaching practicum. The STR interviews were transcribed verbatim and data related to

early-career teacher's strategy use during the critical situation were chosen for analysis. The abductive analysis process included going back and forth between the data, interpretations made, and theoretical understanding of the phenomenon based on prior studies. The combination of extensive theoretical preparation and systematic methodological data analysis was thought to produce an optimum understanding of the primary strategies that early-career teachers apply in classroom interaction situations (Haig, 2005; Morgan, 2007; Tavory & Timmermans, 2014). The analysis consisted of three complementary phases (see Figure 3).
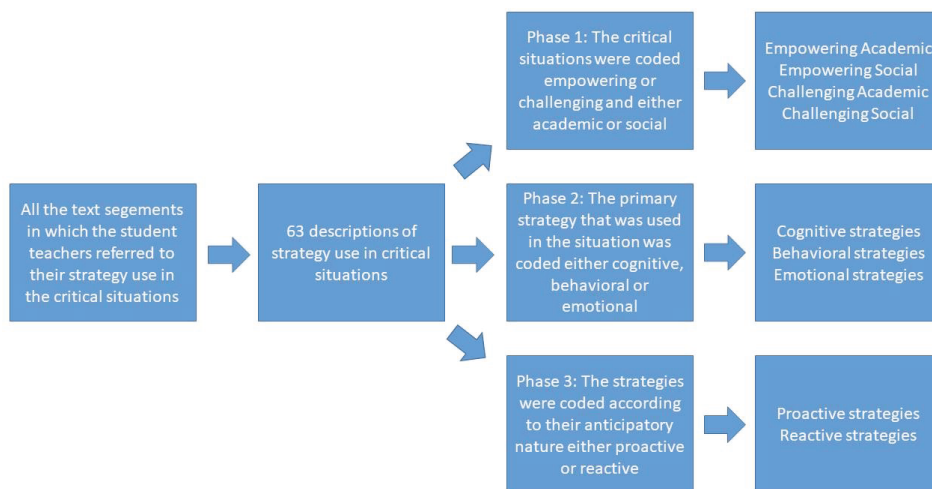
Figure 3. The three complementary phases of the analysis protocol in *Study III*.

At first, the 63 critical classroom situations that early-career teachers had chosen were coded exclusively as either challenging or empowering. Challenging situations included episodes that early-career teachers experienced as being difficult, and empowering situations were those perceived as being successful. The situations were then coded exclusively as either academic or social according to the focal point of the events (Clunies-Ross et al., 2008). Situations related to curricular content, teaching or pupil learning were coded as academic situations. Interruptions during the lesson, transitions between tasks and events concerning teacher-pupil relationships were coded as social situations.

In the second phase, descriptions of early-career teachers' strategy use during the classroom situation were coded into three exclusive categories according to the type of the strategy: cognitive, behavioural or emotional (Clark & Peterson, 1986; Emmer & Stough, 2001). Cognitive strategies entailed mental processes that were used to regulate classroom interaction actively and reflectively, such as deliberate monitoring of events and adaptive planning in classroom interactions. Early-career teachers' concrete and physical efforts to create, sustain or regulate classroom activities were coded as behavioural strategies. Emotional strategies

consisted of their attempts to regulate the spontaneous flow of feelings in the classroom situations, such as amplifying, minimizing, redirecting or switching affective reactions. If an early-career teacher described how they used several strategies during the situation, the focus was on the cognitions, behaviours or emotions that were repeated and emphasized.

In the third phase, the strategies were coded according to their anticipatory nature either into proactive or reactive strategies (Aspinwall & Taylor, 1997; Greenglass & Fiksenbaum, 2009). Future-oriented efforts to anticipate, control and influence classroom events were coded as proactive strategies, whereas reactive strategies included spontaneous and immediate responses on events that had already occurred. Finally, the qualities of the strategies and their connections to challenging and empowering and academic and social classroom situations were elaborated.

4.5 Summary of the methods

The dissertation was conducted as an example of mixed method research comprising two quantitative and one qualitative studies (see Table 1). It included three cohorts of early-career teachers drawn from particular phases of becoming experienced professionals. The survey data sets were analysed by means of SEM. Qualitative content analysis following abductive strategy was conducted in the STR interview study. The purpose of *Study I* was to examine the relationships between the early-career teachers' sense of professional agency in the classroom, the inadequacy experienced in teacher pupil interaction and turnover intentions during the early years in the teaching profession. *Study II* was a longitudinal investigation of the anatomy of sense of professional agency in the classroom and its development during the bachelor's degree phase in teacher education. The aim with *Study III* was to explore the instructional strategies that early-career teachers use in classroom interaction during teaching practicums and how they determine classroom situations and their suitability for learning professional agency in the classroom.

Table 1. Summary of the methods according to the three studies.

	Study I	*Study II*	*Study III*
General aim (RQ)	Explore the relations between early-career teachers' sense of professional agency, perceived inadequacy in teacher-pupil interaction and turnover intentions during the first five years in the profession. (RQ 1)	Explore the development of early-career teachers' sense of professional agency in the classroom during bachelor's degree phase in teacher education. (RQ 2)	Explore the strategies early-career teachers utilize in classroom interaction situations during teaching practicums. (RQ 3)
Participants	Cohort 1: 284 Finnish comprehensive school teachers with 5 or fewer years of experience. 26% primary, 27% secondary and 46% special education teachers. Age (M/SD/min/max): 32.50/4.76/25/54. 90% female	Cohort 2: 268 primary school teachers during their bachelor's degree phase at three different universities in Finland. Age (M/SD/min/max): 23.93/5.05/20/46. 78% female	Cohort 3: 31 teachers attending a teaching practicum at the end of their studies. 81% primary, 19% secondary school teachers. Age (M/SD/min/max): 26.03/4.16/21/37. 84% female
Data	Survey. Cross-sectional	Survey. Longitudinal	STR interview
Instrument & Scales	*Teachers' Sense of professional agency* (TPA) survey: *Teachers' professional agency in the classroom* scale. *Inadequacy in teacher-pupil interaction* scale. *Turnover intentions* (yes/no)	*Student teachers' Sense of professional agency* survey: *Student teachers' professional agency in the classroom* scale	*Guided reflection procedure*: Video recorded critical situations were used as a stimulus in the STR interviews that were embedded in the procedure
Analysis	SEM	SEM	Qualit. content analysis

5 Results

The aim with this dissertation was to investigate early-career teachers' active, intentional and skilful learning by exploring their sense of professional agency in the classroom, how it is related to the challenges experienced during the first five years in the profession and how it develops during teacher education. The core results are presented below according to the research questions starting from early-career teachers who have completed their MA degrees and have five or fewer years of experience of working as a teacher, followed by the results concerning the development of early-career teachers' professional agency in the classroom during their Bachelor's degree studies in teacher education. Finally, the qualities of the strategies that early-career teachers apply in classroom interaction during the teaching practice period at the end of teacher education are reported.

5.1 Early-career teachers' sense of professional agency in the classroom and perceived inadequacy during the first years

Early-career teachers' ability to reflect in classroom interaction situations (REF) and their capacity to construct engaging participative environments that facilitate co-learning (CLE) were moderately related yet distinct modes of sense of professional agency in the classroom during the first few years in teaching. This indicated that sense of professional agency in the classroom could be treated as an integrative factor when its relationships to early-career teachers' turnover intentions and perceived inadequacy in teacher-pupil interaction were further examined. The modes of sense of professional agency in the classroom, including active reflection in the classroom (REF) and construction of collaborative learning environments (CLE), correlated negatively with perceptions of having inadequate abilities to handle difficult situations with pupils (INAD) (see Table 2). This suggested a negative association between early-career teachers' perceived inadequacy in teacher-pupil interaction and their capacity to enhance learning in the classroom actively and skilfully during the first years in teaching. Thirty-five per cent of the 284 early-career teachers with a maximum of five years of experience of working in schools entertained turnover intentions.

Table 2. Means, standard deviations and zero order correlation of the variables used in *Study I.*

Items	1.	2.	3.
1. Inadequacy in teacher-pupil interaction (INAD)	1.00		
2. Collaborative learning environment & transformative practice (CLE)	-.56	1.00	
3. Reflection in classroom (REF)	-.19	.45	1.00
Mean	3.04	5.33	6.08
SD	1.28	0.75	0.65

All correlations were significant at p level < .01.

Further examination showed that considering leaving the teaching profession was positively associated ($\gamma = .35$, $p < .01$) with perceiving inadequate skills and strategies for handling challenging teacher-pupil situations in the classroom (INAD) (see model fit in Figure 4). More precisely, early-career teachers' turnover intentions were associated with questioning one's own abilities and experiencing failure in teacher-pupil interaction. Furthermore, work experience correlated negatively ($\gamma = -.18$, $p < .01$) with constant feelings of being unable to handle problematic teacher-pupil situations. Accordingly, early-career teachers who had considered leaving the profession perceived more uncertainty, failure and shortage related to the skills needed for interacting with pupils, but through working in the classroom, teachers' early experiences of inadequacy in teacher-pupil interaction diminished.

Early-career teachers' feelings of having inadequate strategies for dealing with problematic encounters with pupils (INAD) showed a strong negative correlation ($\beta = -.74$, $p < .01$) with their sense of professional agency in the classroom (AGENCY) in the beginning of their career. Teachers who experienced inadequacy in teacher-pupil interactions were less motivated and less confident about their abilities and strategies for constructing reciprocal and collaborative learning through active reflection, adaptive teaching methods and the use of pupils as resources for learning in the classroom. Perceptions of inadequate capabilities and skills for solving and managing difficult situations with pupils explained 56 per cent of the variance of early-career teachers' capacity to actively challenge, analyse and transform their actions related to enhancing learning in the classroom.
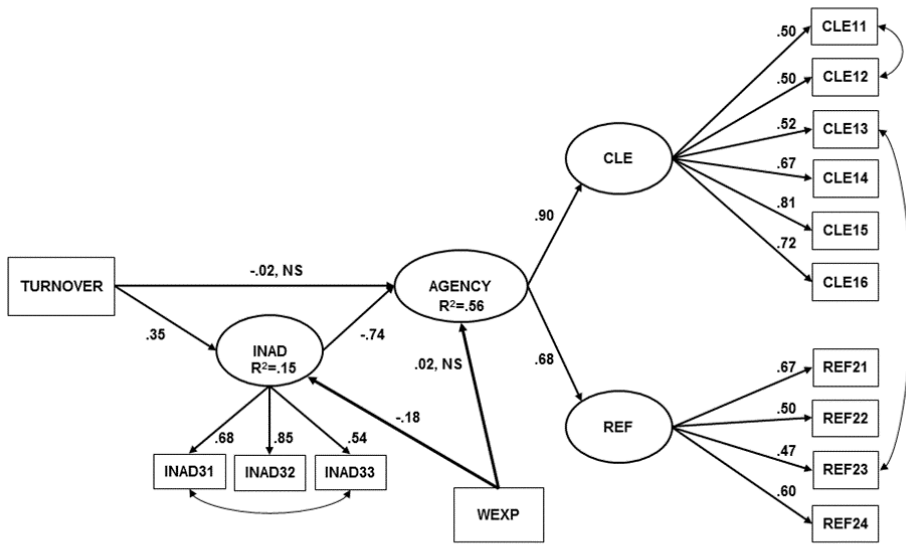
Figure 4. Standardized model: χ² (82, N = 284) = 142.65, p < .001, CFI = .94, TLI = .92, RMSEA = .05 (90% CI = .04–.07), SRMR = .08.

The amount of experience of working as a teacher did not correlate with early-career teachers' sense of professional agency in the classroom (γ = .02, p = .73). During the first five years in the teaching profession, work experience did not determine teachers' capacity to reflect constantly in teacher-pupil interaction and transform the environment accordingly to enhance reciprocal co-learning. Furthermore, early-career teachers' turnover intentions were not directly related to their motivation, self-efficacy and strategies for regulating learning in the classroom (γ = –.02, p = .81). However, considering leaving the teaching profession was indirectly related to their sense of professional agency in the classroom (–.26), through perceived inadequacy in teacher-pupil interaction. That is, the negative effect turnover intentions had on early-career teachers' capacity to develop their expertise was explained by their experiences of constant frustration in difficult teacher-pupil situations.

Key findings:

- Considering leaving the teaching profession was positively associated with questioning one's own abilities and experiencing failure in teacher-pupil interaction.
- Work experience did not determine early-career teachers' motivation, self-efficacy beliefs and strategies for learning in the classroom. However, work experience diminished perceived inadequacy in challenging teacher-pupil situations, which was a key determinant of their sense of professional agency in the classroom.
- Early-career teachers who experienced inadequacy in teacher-pupil interaction reported less motivation and self-efficacy and fewer strategies for constructing collaborative learning environments through active reflection in the classroom.
- The association between considering leaving the teaching profession and a lower sense of professional agency in the classroom was explained by constant disappointment, worry and lack of confidence in teacher-pupil interaction.

5.2 Anatomy of early-career teachers' sense of professional agency in the classroom during teacher education

During the first three years in teacher education, early-career teachers were shown to be able to learn by reflecting, observing, analysing and adapting others' teaching practices in the classroom. Like teachers during their first few years in the profession, early-career teachers perceived their motivation and ability to consider classroom situations critically (REF) relatively high during the bachelor's degree phase (see Table 3). Furthermore, the ability to learn novel instructional strategies by observing authentic teaching of others (MOD) was shown to be stable and a highly valued strategy for learning in the classroom during teacher education.

During the bachelor's degree, early-career teachers' sense of professional agency developed in terms of becoming more self-efficacious in constructing and transforming the learning environment according to pupils' needs (CLE) and gaining a more comprehensive sense of how to develop instructional methods actively (COM). Their capacity to build functional participative environments that yield co-learning (CLE) increased particularly during the third academic year in teacher education and reached a similar level that early-career teachers reported at the beginning of their teaching career. Experiences of having the required knowledge and skills for evaluating one's instructional choices and utilizing novel functional teaching methods (COM) developed constantly from the beginning of the teacher education, which emphasized perceived teaching competence as a central mode of sense of professional agency in the classroom in the teacher education context.

Table 3. Means, standard deviations, minimum and maximum values, Cronbach's alphas and correlations between the study variables in *Study II*.

Items	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. REF1	1.00											
2. REF2	.58 **	1.00										
3. REF3	.40 **	.56 **	1.00									
4. MOD1	.30 **	.25 **	.27 **	1.00								
5. MOD2	.20 *	.28 **	.17	.27 **	1.00							
6. MOD3	.13	.26 **	.42 **	.23 **	.42 **	1.00						
7. CLE1	.45 **	.26 **	.12	.23 **	.10	.03	1.00					
8. CLE2	.16 *	.36 **	.09	.10	.11	.13	.57 **	1.00				
9. CLE3	.18 *	.36 **	.48 **	.24 **	.18 *	.23 **	.48 **	.55 **	1.00			
10. COM1	.28 **	.30 **	.21 **	.32 **	.28 **	.12	.62 **	.47 **	.43 **	1.00		
11. COM2	.20 *	.34 **	.27 **	.25 **	.30 **	.21 *	.35 **	.52 **	.45 **	.57 **	1.00	
12. COM3	.09	.31 **	.42 **	.13	.27 **	.38 **	.26 **	.38 **	.63 **	.41 **	.56 **	1.00
Mean	6.17	6.18	6.25	5.96	5.72	5.84	4.93	4.95	5.23	4.57	4.75	5.07
SD	0.60	0.56	0.54	0.82	0.93	0.91	0.73	0.69	0.59	0.91	0.76	0.68
Min	1.20	4.40	4.60	3.50	2.00	2.00	2.38	2.88	3.25	2.20	2.00	3.20
Max	7.00	7.00	7.00	7.00	7.00	7.00	6.63	6.25	6.63	6.40	6.80	6.60
α	.69	.67	.68	.79	.89	.85	.84	.85	.82	.87	.82	.80

*Note: * $p < 0.05$, ** $p < 0.01$*

The consistent and moderate correlations between the modes of sense of professional agency in the classroom (REF, MOD, CLE and COM) indicated that it is an integrative concept that consists of separate yet interrelated factors. The contextualised modes of early-career teachers' sense of professional agency in the classroom correlated statistically significantly in the expected direction within the three measures and the relationships remained relatively stable during the three years. However, there was a tendency for the correlations to slightly decrease in the second academic year and then increase in the third year. Hence, the weak association between early-career teachers' learning by observing others' teaching

practices (MOD) and their ability to create and maintain functional collaborative learning environments (CLE) was not statistically significant in the second year. This consistently small correlation indicated that observing others' instructional methods was not a dominant factor in terms of early-career teachers' learning to construct and adapt the learning environment according to pupils' needs.

A more comprehensive investigation showed that early-career teachers' capacity to reflect in pedagogical situations (REF) formed a base for sense of professional agency in the classroom during the bachelor's degree phase (see model and fit in Figure 5). Early-career teachers' motivation and ability to reflect actively in teaching situations (REF) was positively and consistently associated with their learning by observing other teachers in authentic classroom situations and modelling their teaching (MOD) in each academic year (T1: γ=.30, p<.01; T2: β=.24, p<.01; T3: β=.36, p<.01). Furthermore, critical and reflective meaning-making in classroom events (REF) correlated with early-career teachers' ability to responsively construct and regulate supportive, adaptive and engaging classroom interaction (CLE) in all three academic years (T1: γ=.45, p<.01; T2: β=.22, p<.01; T3: β =.39, p<.01). These positive correlations between early-career teachers' motivation and ability to reflect actively in classroom situations (REF), their learning by screening more advanced teachers and peers in authentic classroom situations (MOD) and their capacity to construct functional learning environments that foster co-learning (CLE) showed a tendency to decrease during the second year and then increase in the third year.
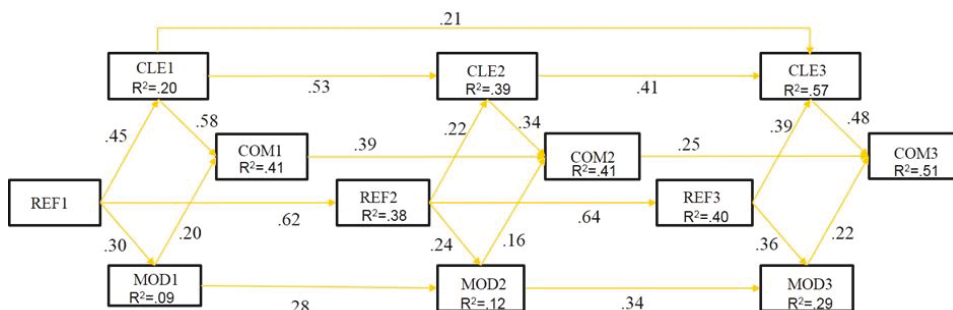
Figure 5. Standardized model: χ^2 (44, N = 268) = 89.20, p < .001, CFI = .94, TLI = .91, RMSEA = .06 (90% CI =.04 - .08), SRMR = .08. The parameters were all significant at p level < .05. Note: One [autocorrelative] residual covariance of an observed variable was added.

The results further showed that the ability to learn by observing others' instructional practices in authentic situations (MOD) and the capacity to promote reciprocal participative learning environments (CLE) were positively associated with the competence experienced by early-career teachers in teaching (COM) during their bachelor's degree. Early-career teachers' intentional learning by modelling peers and more experienced teachers (MOD) correlated positively with experiences of possessing the skills and knowledge required for active transformation

and development of teaching practices (COM) in all three academic years (T1: β=.20, p<.01; T2: β=.16, p<.05; T3: β=.22, p<.01). Capacity to construct functional collaborative learning environments in response to pupils' needs and ideas (CLE) showed a relatively strong positive relationship with teaching competence (COM) within the three first years in teacher education (T1: β=.58, p<.01; T2: β=.34, p<.01; T3: β=.48, p<.01). However, there was a decrease in the association in the second year and then an increase in the third academic year, which indicated that early-career teachers' competence for developing, transforming and experimenting with novel teaching methods was temporarily less related to their motivation, self-efficacy beliefs and strategies for enhancing and regulating the quality of classroom interaction.

The results further confirmed the solid anatomy of early-career teachers' sense of professional agency in the classroom during teacher education in terms of the stability of its contextualised modes, including reflection in the classroom (REF), capacity to learn by observing and modeling other teachers (MOD), ability to construct and adapt participative collaborative learning environments (CLE) and perceived competence for teaching (COM) (see Figure 5). However, early-career teachers' motivation and self-efficacy beliefs for constructing and regulating supportive engaging learning environments (CLE) was more predictable than the other modes, since it had a statistically significant autoregressive effect also between the first and third study year. The result indicated that capacity to facilitate reciprocal engaging interaction with pupils and build a supportive learning environment in the classroom during the first year also predicted early-career teachers' will and abilities to promote responsive interaction and reciprocal learning in the classroom later on in their studies.

Moreover, early-career teachers' experiences of having the knowledge and skills required for developing and experimenting with novel instructional methods (COM), which was the central increasing mode of sense of professional agency in the classroom, became less dependent on their perceived teaching competence in the previous year. That is, being motivated and self-efficacious in applying and adapting new teaching methods according to the context, curricular content and pupils' learning needs became more dynamic simultaneously with becoming more strongly related to their motivation, self-efficacy and strategies for using other teachers and teacher-pupil interaction as resources for developing teaching expertise.

Key findings:
- Early-career teachers' ability to reflect in the classroom was positively and consistently associated with learning by observing other teachers in authentic classroom situations and with their capacity to construct supportive engaging classroom interaction responsively.

- Learning by observing authentic teaching situations and capacity to promote reciprocal participative learning environments were positively related to early-career teachers' teaching competence, including ability to develop and experiment with various functional teaching methods.
- These correlations between the contextualised modes of early-career teachers' sense of professional agency in the classroom showed a tendency to decrease in the second year and then increase during the third year.
- The experience of teaching competence became less stable and more strongly related to learning from other teachers and using pupils as a resource in constructing functional learning environments.

5.3 Instructional strategies in empowering and challenging classroom situations

To explore how early-career teachers act in successful and challenging classroom interaction situations with pupils during teaching practice periods, STR interviews focusing on video recorded critical situations that early-career teachers perceived as meaningful for their learning were analysed. These classroom interaction situations were mostly academic in terms of focusing on giving instructions, guiding pupils' learning or facilitating curricular activities (see Table 4). The academic situations were distributed evenly as empowering and challenging. Less than a third of the situations were social (i.e., focusing on teacher-pupil interaction/relationships instead of curricular activities) including transitions between instructional activities, worries that pupils expressed and disagreements or conflicts with pupils. The social situations were experienced more frequently as being challenging than empowering.

Table 4. Early-career teachers' strategies in classroom interaction situations in *Study III*.

	Empowering		Challenging		Total
	Academic	Social	Academic	Social	
Proactive Cognitive	11	-	1	3	15
Reactive Cognitive	-	-	-	-	-
Proactive Behavioural	10	4	2	2	18
Reactive Behavioural	-	1	19	7	27
Proactive Emotional	2	1	-	-	3
Reactive Emotional	-	-	-	-	-
Total	23	6	22	12	63

Most of the strategies that early-career teachers reported using were behavioural (see Table 4), consisting of early-career teacher's behavioural efforts to regulate the classroom interaction situation. The behavioural strategies were more often reactive than proactive as they consisted of quick replies to unexpected situations and focused on events that had already taken place. These rigid responses to un-predicted experienced threats were mostly used in challenging academic class-room situations. The proactive behavioural strategies that early-career teachers reported using were anticipating physical efforts to motivate and engage pupils, maintain an optimal climate and confirm smoothness of the lesson. The proactive behavioural strategies were most often used in successful academic classroom sit-uations. Cognitive strategies were all proactive: they consisted of early-career teachers' quick anticipating thought processes including active monitoring of pu-pils and the situation, interactive adaptive planning and considering one's confi-dence. These attentive strategies were used predominantly in academic classroom situations that early-career teachers perceived as empowering in terms of their learning. Early-career teachers rarely used emotional strategies. The emotional strategies were proactive, consisted of up- or down-regulation of their emotions, and were used in successful classroom situations.

In the classroom situations that early-career teachers perceived as challenging in terms of their learning, they predominantly reported using reactive behavioural strategies. These were quick and rigid reactions to events that had already oc-curred and threatened early-career teachers' sense of control in the situation. The situations that included reactive behavioural strategies were often characterized with expressions of nervousness, stress, inadequacy, uncertainty or time pressure. These strains and tensions seemed to restrict early-career teachers' informed in-terpretations of the situations. Reactive behavioural strategies included limited observations, difficulties in noticing the situational challenges and misreading of the events, which seemed to limit their strategic actions. A decreased sense of control, restricted information processing and stress resulted in simple, authorita-tive, inflexible and evasive actions. Early-career teachers were not able to trans-form their script despite novel information, such as pupils' feedback, questions or answers. Reactive strategies were necessary evasive actions performed in order to retreat from or survive in the situation and continue the lesson. In some cases, early-career teachers' survival orientation and inward focus resulted in situations in which neglecting or ignoring the events, for example by walking away, was the only response available.

In the situations that early-career teachers perceived as being successful and meaningful for their learning, the primary strategies used were predominantly pro-active as they anticipated upcoming events and the flow of the lesson. Instead of spontaneous reactions to episodes, proactive behavioural strategies entailed early-career teachers' self-initiative physical actions that were typically pupil-centred and aimed at facilitating active motivated pupil learning in academic classroom

situations. Proactive behavioural strategies were predominantly pre-planned in terms of considering the nature of the task and prior knowledge and experiences with the pupils. Thus, early-career teachers were able to act straightforwardly and compassionately to ensure that pupils were engaged, such as by regulating the learning of a particular pupil or the interaction of a group. Behavioural proactive strategies were not necessarily planned for an episode or section in the lesson. These simple strategies were familiar to early-career teachers and/or to pupils from previous experiences and they were used to make sure that the pupils followed the instruction and understood the task and to regulate the climate, pace and course of events during the lesson. That is, proactive behavioural strategies were confirmative in nature; they were used to ensure and support the enactment of the original script of the lesson. With proactive behavioural strategies, teachers aimed to consolidate the lesson and avoid problems by ensuring the purposeful pace of curricular tasks, smooth transitions between them and by facilitating safe and engaging learning environments.

Proactive cognitive strategies were used in classroom situations that early-career teachers perceived as being successful and important regarding their learning. Proactive cognitive strategies entailed careful observation of the pupils and a reflective stance towards their actions. Early-career teachers monitored pupils' behaviour and interpreted their understanding and required responses in the situation. These deliberate efforts were used to consider the pupils' perspective, ideas and initiatives in order to adapt the situation. Early-career teachers were able to use the information gathered from pupils, flexibly transform their script of the lesson and adapt their immediate responses when necessary and feasible. Continuous monitoring of individual pupils and groups enabled providing and regulating support according to their learning needs (e.g., scaffolding). In some cases, early-career teachers observed and appraised the lesson to be on the right track and that there was no need to change the ongoing activities. Proactive cognitive strategies were responsive, adaptive and sometimes even enabled early-career teachers to perceive the needs of pupils as learning challenges for themselves. Early-career teachers were open to unexpected situations and willing to use and experiment with content-specific and pupil-specific cues. In some situations, the early-career teachers made positive evaluations of their abilities in the situations, which further enhanced their confidence and calmness in their future actions.

Emotional strategies were rarely reported. They were all proactive and entailed early-career teachers' efforts to regulate their own emotions in the classroom situations. Early-career teachers down-regulated their negative emotions, including irritation and frustration, and the physical reactions related to them (e.g., facial expressions). They also up-regulated emotions in terms of expressing and accentuating enthusiasm and joy to their pupils. The emotional strategies were all proactive; they were used to facilitate functional teacher-pupil interaction by sup-

pressing negative emotions and to enhance the learning environment by expressing positive emotions. Regulating one's emotions was perceived as being essential for controlling one's own actions and the course of events.

Key findings:

- Early-career teachers focused on reflecting academic classroom situations meaningful for their learning over social situations.
- Early-career teachers most often applied reactive behavioural strategies. Also, proactive behavioural and proactive cognitive strategies were used, whereas emotional strategies were rarely reported.
- Reactive behavioural strategies were predominantly used in challenging classroom situations. They were quick, rigid, inward-focused and survival-oriented responses that seemed to restrain early-career teachers' sense of control in the situation.
- Proactive cognitive strategies were central in empowering classroom situations. They entailed attentive monitoring of pupils and events and careful interpretations of classroom situations that enabled flexible, adaptive and transformative responses.

6 Discussion

6.1 Methodological and ethical reflections

This doctoral dissertation applied a mixed-method approach in order to provide an extensive and enriched understanding of early-career teachers' professional agency in the classroom (Bryman, 2006; Creswell & Plano Clark, 2018; Greene et al., 1989; Johnson et al., 2007; Teddlie & Tashakkori, 2003, 2009). The study was carried out using the convergent mixed-method design that consists of concurrent but separate quantitative and qualitative data collections and analyses as well as interpretations combining the results (Creswell & Plano Clark, 2018). Through the design, the aim was to increase understanding of how early-career teachers' sense of professional agency in the classroom is challenged during their early years in the profession and how it is learned during teacher education. Furthermore, the goal was to explore early-career teachers' instructional strategies in classroom situations during teaching practice periods in teacher education. *Study I* included survey data and quantitative analyses, which made it possible to examine the relationships between early-career teachers' sense of professional agency in the classroom, perceived inadequacy in teacher-pupil interaction and turnover intentions during the first few years of working as teachers. *Study II* also applied quantitative data and analyses to investigate the interrelationships between the modes of early-career teachers' sense of professional agency in the classroom during the first three years in teacher education. *Study III* consisted of STR interview data and qualitative analysis that enabled examining the instructional strategies that early-career teachers reported applying in empowering and challenging classroom situations during teaching practicums. The results were brought together in this doctoral dissertation.

Reflections on the mixed methods

Mixed method studies are commonly evaluated with the concepts *inference quality* and *inference transferability* (O'Cathain, 2010; Teddlie & Tashakkori, 2003, 2009). *Inference quality* refers to the internal validity (in quantitative) and credibility (in qualitative) of the study. *Inference transferability* refers to the external validity (in quantitative) and transferability (in qualitative) of the interpretations and is evaluated to determine whether the conclusions made in a mixed method study can be extrapolated to other groups, contexts, time periods, theories or methods of enquiry (Teddlie & Tashakkori, 2003, 2009).

    Inference quality comprises *design quality*, including appropriate data collection and analysis procedures that are chosen and guided by the research questions and implemented with accuracy, and *interpretive rigor*, consisting of credible,

consistent and defensible interpretations (Tesslie & Tashakkori, 2009). More precisely, the *design quality* of a study requires ensuring a match between the aim of the research, the methodological choices and the purpose of applying mixed methods (*design suitability*), applying the chosen data collection and analysis procedures with adequate quality and rigor (*design fidelity*), consistency within and a seamless fit between the sub-study designs (*within-design consistency*) and appropriate analysis strategies for answering the research questions (*analytic adequacy*) (Teddlie & Tashakkori, 2009). *Interpretive rigor* is constructed by grounding the inferences logically to (the nature of) the findings in question *(interpretive consistency)*, reflecting the inferences to the state of knowledge in the field (*theoretical consistency*), evaluating inferences with other scholars and/or participants (*interpretive agreement*), justifying the plausibility of the inferences compared to optional interpretations (*interpretive distinctiveness*) and by making meaningful conclusions/meta-inference from the interpretations (*integrative efficacy*) that correspond to the research questions and purpose of applying mixed methods (*interpretive correspondence*) (Teddlie & Tashakkori, 2009).

The *design suitability* of the thesis was formed by applying the convergent mixed method design that was suitable for answering the overall research questions, appropriate for examining the more detailed hypotheses and research questions within the studies and matched the overall purpose of constructing a better understanding of teachers' sense of professional agency in the classroom during teacher education and the first year in the profession (O'Cathain, 2010; Teddlie & Tashakkori, 2009). In other words, the methodological choices and the purpose of applying mixed methods were based on approaching the cognitive, motivational-affective and behavioural nature of early-career teachers' learning and actions in the classroom.

The *design fidelity* of this study was enhanced by collecting data from three cohorts of early-career teachers, who were at different phases of their careers. Cohort I included early-career teachers who were working as teachers and had five or fewer years of experience of working as professional teachers. Cohort II comprised early-career teachers who had started their teacher education studies in 2012 and were contacted annually during the three year bachelor's degree phase. Early-career teachers in the master's degree phase of their studies comprised Cohort III. Furthermore, the study applied appropriate sampling methods and instruments that had been designed based on rigorous qualitative research, had been pilot tested and validated in earlier studies by the research group (Husu et al., 2008; Pietarinen et al., 2013; 2016; Soini et al., 2010; 2015; 2016; Toom et al., 2015). The stimulated recall interviews and the video recordings preceding them were conducted by the author in collaboration with a senior researcher as a part of the *Procedure of guided reflection* (Husu et al., 2008; Toom et al., 2015). These refined processes promoted the quality of the data and with advanced quantitative and qualitative analysis methods, ensured the adequacy of the design.

The *within-design consistency* of the thesis was formed by applying data collection and analysis methods that were in line with the pragmatic grounding of the study and considered suitable for approaching the intellectual and motivational nature of early-career teachers' learning and actions in the classroom. In other words, applying self-report methods was considered to be a consistent choice, the aim of which was to form a coherent big picture of early-career teachers' sense of professional agency and strategies in the classroom interaction context. Furthermore, the instruments and data collection procedures had been designed for these cohorts and contexts (school, teacher education, teaching practicum). The *Procedure of guided reflection* (in Study III) had been designed as part of an international research collaboration. The procedure was based on previous research in the Finnish context (Husu et al., 2008; Toom et al., 2015) and had been appropriately translated for use in Finnish teacher education without losing its consistency.

Since the aim of the two quantitative studies was to examine relationships between the study variables, a variable-oriented correlational research strategy was applied. Advanced quantitative methods, including structural equation modelling (SEM), were suitable for investigating the relationships between latent factors and summated scales within different measurement time points. Qualitative content analysis with abductive analysis strategy was applied to investigate the strategies early-career teachers use in classroom situations during teacher education. The abductive strategy was used to enable a reciprocal process that utilized knowledge based on the literature and the observations made from the data to answer the research question. These methodological choices provided *analytical adequacy* (Teddlie & Tashakkori, 2009) to the research design as they enabled approaching the research aim of the thesis.

The consistency of the interpretations made in this thesis were based on deliberate consideration and appropriate presentation of the analysis procedures and the results. Accordingly, the interpretations were strictly grounded on the results (e.g., estimates, effect sizes, categorizations, frequencies, descriptions), they were guided by the features of the chosen analysis methods (e.g., correlational, content analysis) and did not include contradicting readings of the same results (e.g. statistical model, classroom situations). Interpretations were also theoretically consistent as they were in line with the state of knowledge in the field (Teddlie & Tashakkori, 2009). The interpretations presented in individual sub-studies were evaluated in the peer review processes of the scholarly journals and presented to research communities during international conferences. In addition, the interpretations made in *Study III*, that included interviews of early-career teachers during teaching practicums, were presented to participants and the supervising teachers. Furthermore, all analyses and interpretations made from the results were discussed with several researchers in the research group and in seminars during the various phases of the research. These processes provided *interpretative agreement* and

reduced the chance of researcher bias through *investigator triangulation* (Archibald, 2016; Creswell & Miller, 2000; Denzin, 1970; 2010).

The *interpretive distinctiveness* of the thesis was enhanced in *Study III* by presenting the phases of the study to experienced international scholars who visited the research group. These meetings can be considered to have been peer debriefings during which analysis procedures and interpretations were presented to the scholars in order to receive feedback that uncovers the taken-for-granted biases, perspectives and assumptions of the author (Miles & Huberman, 1994; Onwuegbuzie & Leech, 2007). However, these scholars were not disinterested outsiders, but were experienced researchers within the field and active collaborators with the group. In addition, the analysis resulted in only three emotional strategies that can be considered to be rare cases (i.e., negative cases, Miles & Huberman, 1994). Examining these cases contributed to the abductive analysis process by confirming the patterns that emerged from the data and overall understanding of cognitive, behavioural and emotional strategies.

In this thesis, the interpretations based on the individual studies were linked and elaborated in order to make wider inferences regarding early-career teachers' sense of professional agency, perceived inadequacy and strategies in the classroom. The meta-inferences combined interpretations based on all the three studies. The aim of this research thesis was fulfilled, and responses to the research questions were based on the study specific conclusions and the meta-inferences made from them (Teddlie & Tashakkori, 2009). Accordingly, the purpose of applying mixed methods was fulfilled in terms of accomplishing a fuller picture of the phenomenon.

There are certain limitations related to the *inference quality* of the dissertation, especially in terms of its design. First, the dissertation did not include longitudinal data collected over the transition, that is, the crucial point when early-career teachers enter their own classrooms. Such data would provide significant information on how early-career teachers' professional agency in the classroom is transformed according to the changes in their learning environment. However, the dissertation did include early-career teachers from several phases of teacher education and the first five years in the profession, and a longitudinal approach was included. Combining both cross-sectional and longitudinal data created *time triangulation* (Cohen, Manion, & Morrison, 2011) and brought temporal scope and depth to the dissertation. Thus, the dissertation may have constructed a general view of early-career teachers' professional agency in the classroom during the early phases of becoming an experienced teacher. Second, since the data used in the dissertation consisted only of self-reports, the results are based on early-career teachers' perceptions of their thoughts, emotions and behaviour and do not include their actual behavioural efforts in the classroom. Including observations or video analysis could have provided a more extensive view of early-career teachers' professional agency in the classroom and more information on the relationships between early-

career teachers' behavioural tendencies and their capacity to be active and skillful when they change their instructional practices in the classroom (e.g., Hoekstra, Beijaard, Brekelmans, & Korthagen, 2007; Saariaho et al., 2019). However, survey data and stimulated recall interviews were considered to be optimal for examining the motivational-affective and intellectual nature of early-career teachers' professional agency in the classroom as some other methods would have not been suitable for the classroom context (e.g. think aloud).

Ecological transferability refers to the applicability of the interpretations and recommendations in similar authentic settings, whereas *population transferability* concerns the degree to which the inferences can be applied to other people (Cohen et al., 2011; Teddlie & Tashakkori, 2009). In this study, transferability of the inferences was enhanced by including two large samples of early-career teachers: comprehensive school teachers from a national sample of teachers working in schools, and primary school teachers studying in teacher education programs at three universities. The structure of teacher education and the way teaching practicums are arranged is similar across the Finnish universities, which suggest that the results may be applied at least in other Finnish teacher education settings. Also, in the interview study (*Study III*), a relatively large sample of early-career teachers studying to become primary and secondary school teachers was included. Overall, generalizing the meta-inferences made in this dissertation should be done with caution, because of the different sample sizes in the individual studies (Creswell & Plano Clark, 2018) and the highly valued status of the teaching profession and teacher education in Finland. *Temporal transferability* entails also being able to apply the interpretations and recommendations in the future and, in other words, showing that they are not dependent on the time of investigation (Teddlie & Tashakkori, 2009). It was enhanced by including longitudinal examination of early-career teachers' sense of professional agency in the classroom annually during the three first years of teacher education. Furthermore, the results were mainly in line with international studies, which indicates *theoretical transferability* (Maxwell, 1992; Teddlie & Tashakkori, 2009).

Study specific reflections

The early-career teacher data (N=284) used in *Study I* were collected through a survey and included comprehensive school teachers with five or fewer years of experience of working as professional teachers. The data were extracted from a national sample of 2310 teachers that was collected with a random sampling method and it represented the Finnish comprehensive school teacher population well, although female teachers were lightly over-represented (Pietarinen et al., 2013). A limitation of the early-career teacher data set was the overrepresentation of special education teachers. However, the relationships between the factors that were examined in the study were similar across the different teacher groups. The internal consistency of the scales was evaluated by calculating Cronbach's alphas.

Values close to one indicate that items can be considered to measure the same construct and the values 0.70 and 0.60 are considered to be the generally agreed lower levels for acceptance in confirmatory and exploratory approaches (Hair, Black, Babin, & Anderson, 2014). The scales used to measure early-career teachers' sense of professional agency in the classroom and their perceived inadequacy in classroom interaction had been validated in earlier studies (Pietarinen et al., 2016; 2013; Soini et al., 2016) and also showed sufficient reliability in this study (0.82 - 0.61). Although the analysis approach was confirmatory in nature, novel scales were applied as part of an exploratory research project, which allows the use of the lower limit. However, the moderate internal consistency of the *Reflection in classroom* scale (0.61) should be considered when generalising the results and in further development of the instrument. Moreover, turnover intentions were measured with a dichotomous variable, which provides limited information and may produce an oversimplified picture of early-career teachers' considerations of leaving the teaching profession. Nevertheless, the study took a novel approach by considering turnover intentions as a process that may evolve or disappear during the years and possibly have an effect on early-career teachers' professional agency in the classroom.

The cross-sectional data were analysed by means of SEM, which was considered to be appropriate and adequate for detecting the relationships between professional agency in the classroom and perceived inadequacy in teacher-pupil interaction. SEM enabled the application of latent structures, explicitly modelling measurement error and seeking to derive unbiased estimates for the relationships between the factors. The assumptions for the statistical methods were fulfilled and the results provided adequate statistical power in terms of proportion of explained variance (R square = 0.56) for making inferences. The model was estimated with various fit indices (Bentler, 2007; Hu & Bentler, 1999). The fit between the model and data was not optimal, which should be considered when generalizing the conclusions. The chi square test provided no evidence for the fit, which may be due to the large sample size (Iacobucci, 2010; Miles & Shevlin, 2007). However, the various fit indices showed an acceptable fit between the model and the data. Furthermore, the results were in line with previous international literature on teachers' learning and were theoretically sensible.

The longitudinal data in *Study II* were collected from early-career teachers (N=268) studying to become primary school teachers at three Finnish universities. The survey data were collected face-to-face annually in the spring terms of the first, second and third years of their five-year teacher education programs. The data collection procedure was designed and conducted by the research group. There were considerable unit non-response in the second and third academic years, but the longitudinal sample can be considered to be representative of Finnish early-career teachers during their first, second and third academic years in teacher education. Age and gender were related to not responding, but the non-

response analysis showed no significant differences between participants who answered every year and the ones who did not. Furthermore, the distribution of participants into the three universities was moderately even, although one university was slightly overrepresented. The instrument had been adapted to teacher education context from TPA survey and pilot tested to ensure its validity (Soini et al., 2015). The reliability analyses provided Cronbach's alphas between sufficient and good, but indicated a need for further development work to improve the consistency of the *Reflection in classroom* scale (0.67 – 0.69). Overall, following early-career teachers who started studying in 2012 from three universities with a rigorous survey data collection procedure throughout their bachelor's degrees ensured a longitudinal data set of high quality.

SEM was applied in *Study II* to analyse relationships between the contextualized modes of early-career teachers' professional agency in the classroom within the three time points. Due to the complexity of the model commensurate to the size of the sample, the modes of professional agency in the classroom were included as summated scales instead of latent factor structures. Accordingly, it needs to be considered when generalizing the statistical conclusions and planning future studies that the longitudinal measurement invariance of the *Student teachers' professional agency in the classroom* construct was not tested. The fit between data and the estimated model was not perfect, but according to the fit indices it was acceptable. In addition, the scales have been used solely in the Finnish teacher education context, which restricts generalizing the results to other teacher education systems. However, the conclusions drawn were mainly consistent with those from previous international studies.

In *Study III*, the data were collected with STR interviews from early-career teachers (N = 31), including both primary and secondary school teachers, during their teaching practice periods in teacher education at one Finnish university. The *Procedure of guided reflection* (Husu et al., 2008; Leijen et al., 2014; Toom et al., 2015) was utilized and the STR interview protocol was pilot tested before conducting the interviews used in this study. The STR interview provided means for collecting early-career teachers' retrospective reports of their thoughts, emotions and behaviour in authentic classroom situations (Lyle, 2003; Vesterinen et al., 2014). The participants were instructed to watch the video lesson within the next few days, which guaranteed revisiting the classroom situations reliably (Calderhead, 1981). However, the STR interview is a self-report method that produced early-career teachers' retrospective descriptions of behaviours, thoughts and emotions experienced in the situations. The video and the questions also stimulate participants' thoughts and reflections during the interview, which may be difficult to distinguish from the actual events. However, the researcher was not in a teaching position and there was no evaluation involved in the procedure, which reduces the risk of social desirability bias. Accordingly, the thoroughly designed and systematically implemented procedure that guides the participant to choose the lesson

to be videoed and the situations from the video to be discussed during the interview assured high-quality data.

The primary strategies that early-career teachers used in the situations were analysed through content analysis with an abductive strategy (Timmermans & Tavory, 2012). The chosen analysis strategy entailed continuous reciprocal dialogue between empirical observations and assumptions based on the literature and provided appropriate and adequate means for analysing the data (Levin-Rozalis, 2004; Morgan, 2007). The phases and categorisations in the analysis were evaluated and discussed in the research group, which produced *researcher triangulation* (Archibald, 2016; Creswell & Miller, 2000; Denzin, 1970; 2010). Furthermore, the results strongly resonated with prior literature and were displayed in international conferences. The results were also presented to the participating early-career teachers and their supervising teachers. These processes ensured that inferences were grounded in data and logical and decreased the possibility of researcher bias (Lincoln & Guba, 1985; Teddlie & Tashakkori, 2009). Altogether, the results of this study should be cautiously transferred to other teacher education contexts, yet they may have theoretical transferability. Furthermore, the data collection procedures, participants, the context, analysis and inferences were elaborately described in this thesis in order to be transparent (Bryman, 2004).

Ethical reflections

This dissertation followed the official guidelines of the Finnish Advisory Board on Research Integrity (2013). This means responsible conduct of research through honesty, accuracy and by guaranteeing anonymity and confidentiality for the participants (see also Steneck, 2007). The participants were informed about the research, participation was voluntary, no compensation was made or evaluations involved, and they could disengage from the research process at any phase. Informed consent was obtained from the early-career teachers, and permission was sought from the deans and directors of the teacher education institutes, supervising teachers and pupils' parents. The study was carried out without causing harm to the participants and they were treated respectfully throughout the process. The results were presented to teacher educators and early-career teachers, and responsibility and reciprocity were fostered throughout the research.

6.2 Theoretical reflections and synthesis of the findings

Becoming a teacher comprises a fast pace of learning accompanied by various difficulties related to the early years in teaching. It has been shown that being able to learn actively and skilfully in the classroom requires professional agency in the classroom, including motivation to learn, self-efficacy beliefs for learning and strategies for learning in and from classroom interaction (e.g., Soini et al., 2015). Furthermore, there has been extensive research showing that both the encouraging

and the draining experiences related to teachers' work often take place in teacher-pupil interaction, including the challenges experienced during the first few years in the profession (Brekelmans et al., 2005; Le Maistre & Pare, 2010; Lindqvist et al., 2017; Mattsson et al., 2011; Ng et al., 2010; Pennings et al., 2018; Soini et al., 2010; Spilt et al., 2011; van Eekelen et al., 2006). Still, there have been few prior studies that focused on early-career teachers' professional agency in the classroom, and there is a lack of understanding of its anatomy and how it is challenged during the first years in teaching (Soini et al., 2015; Pyhältö et al., submitted). This study contributed to the existing literature by exploring the anatomy of early-career teachers' sense of professional agency in the classroom during the bachelor's degree phase of teacher education and how it is challenged by experiences of having inadequate skills in teacher-pupil situations and considering leaving the teaching profession during the first five years in the profession. Furthermore, the strategies early-career teachers apply in successful and challenging learning situations in the classroom during teaching practicums were examined in order to elaborate on how they determine the suitability of the situations for learning professional agency in the classroom.

The results showed that professional agency in the classroom, comprised of motivation, self-efficacy and strategies for learning, is a central capacity for early-career teachers' active, intentional and skilful learning in the classroom that is challenged during the early years in the teaching profession by experiences of having inadequate skills in teacher-pupil interaction. In line with reports from the literature, the result highlighted the importance of the reciprocal relationship between teachers' learning and well-being in the everyday context of their work (Mattern & Bauer, 2014; Pietarinen et al., 2013; Soini et al., 2010; Väisänen, 2019). Accordingly, early-career teachers' capacity to reflect on and transform their pedagogical practices and the learning environment actively and responsively in the classroom seems to be both regulated by, and is a regulator for, the well-being they experience. This resonates with the literature showing that experiences of having inadequate abilities to manage teacher-pupil interaction situations may overcome early-career teachers' efficacy beliefs, thus causing a deterioration of their capacity to renew, transform or adapt pedagogical practices and the learning environment (Bandura, 1997; Evers et al., 2002; Stein & Wang, 1988; Tschannen-Moran & Hoy, 2001; Wheatley, 2005). However, the relationship between perceiving deficient skills in teacher-pupil situations and the capacity to actively promote and manage new learning in the classroom is reciprocal. That is, a downturn in motivation, self-efficacy beliefs or strategies for constructing collaborative learning environments may trigger experiences of inadequacy in teacher-pupil interaction and even further promote turnover intentions (Skaalvik & Skaalvik, 2007; Spilt et al., 2011; Struyven & Vanthournout, 2014; Veldman et al., 2013).

In this dissertation, turnover intentions were considered to be dynamic factors that may take shape during teacher education or in the first few years in the teaching profession (Clandinin et al., 2015; Hong, 2010; Lanas, 2017). They indicated early-career teachers' valuations of the teaching profession that were assumed to have consequences not only for their professional agency in the classroom, but also to their experiences of control in teacher-pupil situations during the difficult earlier years in the profession (Pekrun, 2006). The results showed that early-career teachers' turnover intentions were positively related to experiences of having inadequate skills in teacher-pupil interaction, which was further negatively associated with their motivation, self-efficacy and strategies for active, intentional and skilful learning. It seems that the doubt related to committing to the teaching profession may reduce the weight of successful experiences of promoting functional classroom interaction and thus bring forth the effect of draining experiences of having inadequate skills in teacher-pupil interaction. Such imbalanced patterns in early-career teachers' judgments about their performance in classroom interaction situations may increase the experiences of repeated unpleasant emotions that can lead to perceived inadequacy and even to burnout or leaving the profession (Chang, 2009; Klassen & Chiu, 2011; Pfitzner-Eden, 2016). Accordingly, it seems that considering leaving the teaching profession makes early-career teachers more sensitive to negative cycles. Experiencing destructive friction in teacher-pupil situations hinders their self-efficacy beliefs, motivation and efforts towards in analysing and transforming pedagogical practice and the learning environments, further regulating their instructional strategies in novel classroom interaction situations.

The results further showed that work experience was negatively related to experienced inadequacy in teacher-pupil interaction, but not related to professional agency in the classroom (see also, Klassen & Chiu, 2011). This indicates that through experience of working in the classroom early-career teachers learn functional strategies for controlling classroom situations, which decreases their perceptions of constantly having inadequate skills in teacher-pupil interaction situations. As such a burden is diminished, early-career teachers' intellectual and motivational capacity is freed for active and reflective transformation of instructional practices and the learning environment to yield co-learning. It seems that the reality shock experienced during transition from the teacher education to teacher's work (e.g. Fantilli & McDougall, 2009; Veenman, 1984) fades away through an evolving repertoire of instructional strategies, which buffers feelings of inadequacy and enables early-career teachers to adapt and promote collaborative learning environments intentionally through active skilful reflection in the classroom.

The results concerning the anatomy of professional agency in the classroom during teacher education confirmed that a motivated and self-efficacious reflective stance towards one's pedagogical practice enables becoming the subject of its development through active and intentional learning from and with others (see

also Crichton & Gil, 2015; Edwards & Protheroe, 2003; Mena et al., 2017; Naidoo & Kirch, 2016). The results provided a novel understanding of the anatomy of early-career teachers' professional agency in the classroom by showing that motivation, self-efficacy beliefs and strategies for active learning from and with others were positively associated with sense of competence for promoting learning in the classroom, and thus seems to build early-career teachers' self-efficacy beliefs and professional agency in the classroom as a whole. In other words, the relationships between the modes of professional agency in the classroom demonstrated their functions in the self-fulfilling process of learning professional agency in the classroom. When early-career teachers learn professional agency in the classroom, they become able to reflect on their professional practice actively and skilfully, which enhances their motivated, self-efficacious and skilful efforts to learn from other teachers and pupils in the classroom. Such active and skilful learning through adopting pedagogical actions learned from other teachers, being open and responsive about pupils' learning needs and adapting the learning environment and pedagogical practice accordingly further enhances their sense of competence in promoting learning for all.

However, learning professional agency in the classroom during the first three years in teacher education seems to be a complex rather than linear development. The results showed that the interrelationships between the modes of professional agency in the classroom tend to decline within the second year and increase in the third academic year. Furthermore, although early-career teachers reported alredy being motivated and self-efficacious in and having the required strategies for evaluating their pedagogical practices during the first year of their studies, it was not until the third year that their perceived capacity to learn actively and intentionally by constructing reciprocal learning environments with pupils increased. These findings resonate with studies which stated that early-career teachers' capacity to learn in the classroom develops over time, but the process may include phases when the contextualized modes of professional agency in the classroom are challenged, rechannelled or restricted according to the first practical experiences of working in the classroom (Boshuizen, 2004; Conway & Clark, 2003; Crichton & Gil, 2015; Endedijk et al., 2014; Fuller & Bown, 1975; Ng et al., 2010; Veenman, 1984). However, it seems that the modes of professional agency in the classroom, each comprising the core components of motivation, self-efficacy beliefs and the strategies for learning, reform their functions in relation to one another as the studying proceeds, thus maintaining early-career teachers' coherent capacity for active skilful learning.

A novel finding was that the stability of early-career teachers' perceived competence for promoting learning in the classroom decreased between the second and third year. As the studies progress, early-career teachers' motivation, self-efficacy beliefs and strategies for actively varying, developing and experimenting

with instructional methods became less connected to their prior sense of competence in teaching and more strongly related to their professional agency in terms of intentionally and skilfully utilizing other teachers and pupils as resources for learning. Accordingly, the results suggest that teacher education succeeds in providing early-career teachers with a functional environment for enhancing their sense of efficacy, motivation and strategies for learning through successful mastery experiences of making changes in classroom practices and pedagogical thinking by intentionally learning from others according to observations of significant features in classroom interaction situations. Furthermore, the results concerning the anatomy of professional agency in the classroom showed that the overall structure of professional agency was stable during the first few years of teacher education. Therefore, it can be concluded that the concept seems applicable and useful for investigating and describing early-career teachers' active skilful learning in classroom interaction context and for developing the structures and pedagogical approaches of teacher education programs.

The results concerning the instructional strategies early-career teachers applied during teaching practicums showed that in the classroom situations they experienced challenging for learning, early-career teachers most often utilized behavioural reactive strategies. These quick and rigid efforts seem dysfunctional for constructing classroom interaction situations that would provide early-career teachers opportunities for learning professional agency in the classroom. They displayed how facing unexpected classroom events may be overwhelming or threatening for early-career teachers with limited experience of working in the classroom (see also Edwards & Protheroe, 2003; Saariaho et al., 2019). Reactive behavioural strategies were inward-focused, survival-oriented and lacked situational openness, sensitiveness and reciprocity, thus providing no opportunities for intent meaning-making and confident transformation of pedagogical actions and the environment. Such experiences of not being able to make a change due to limited observations, insecurity or increased activity level in the situation may generate feelings of inadequacy. Furthermore, it has been shown that negative emotional experiences in teaching practicums may impede early-career teachers' learning and even lead to uncertainty about their choice of profession (Lindqvist et al., 2019; Tiplic et al., 2016; Yuan & Lee, 2016).

The results further showed that early-career teachers' cognitive proactive efforts responding to classroom situations, including monitoring, anticipating and analysing, enabled them to alter their actions to improve teaching and/or learning in those situations. These cognitive proactive strategies seem functional in determining situations suitable for learning professional agency in the classroom by enabling intentional transformation of behaviour and thoughts accordingly. They enable awareness and reciprocity in classroom interaction that enables motivated and self-efficacious efforts to further regulate and promote learning and functional classroom interaction (see also, Blömeke et al., 2015; Jennings & Greenberg,

2009). Also, behavioural and emotional strategies that early-career teachers used in successful situations were mostly proactive. Therefore, it seems that the quality of the strategies that early-career teachers apply in authentic classroom situations may determine the suitability of the situations for learning professional agency in the classroom.

Early-career teachers more often chose to reflect on academic situations compared to social situations. Furthermore, the majority of the social classroom situations were perceived as being challenging or difficult. This indicates a need to support early-career teachers in learning to regulate unexpected social events that may include non-curricular learning objects and wider educational goals for both the pupils the and the teacher (e.g., creating functional teacher-pupil relationships, meeting the needs of individual pupils, providing emotional support). This could provide them with learning experiences through which they are able to transform difficult social situations into learning opportunities through which they can feel motivated and self-efficacious and use the strategies of active skilful learning through reflecting and adapting their thoughts and the situation. In teaching practicums, such social situations and the strategies required in them may get limited attention from early-career teachers, since their main focus is often on learning to plan and implement successful lessons with pre-set curricular goals. Whereas lesson plans function as artefacts powerfully shaping early-career teachers' learning of future actions in terms of delivering lessons, similar tools for learning to interpret and act in challenging social situations with pupils are lacking (Edwards & Protheroe, 2003). It may be that teacher education is not able to provide early-career teachers with opportunities to learn the social and emotional nature of classroom work, which may leave them perceiving that they have inadequate skills when entering the profession (Lindqvist et al., 2019). In other words, strategies for challenging social situations are crucial for constructing teacher-pupil relationships that create the basis for functional interaction and thus for buffering experiences of inadequacy that challenge early-career teachers' professional agency in the classroom during the first few years in the profession.

The results of this thesis imply that early-career teachers' motivation to learn, self-efficacy for learning and strategies for active, intentional and skilful learning are in many ways challenged by the complexity and emotional nature of working and learning with pupils in the classroom. Early-career teachers' professional agency in the classroom first seems to face "a reality shock" during teacher education as well as after entering the profession (Veenman, 1984). However, early-career teachers were also shown to learn professional agency in the classroom during the early years of teacher education by constructing motivation, self-efficacy and strategies for learning through analysing their pedagogical practice and for learning to use other teachers and pupils' as resources in adapting teaching and the environment. They struggled with classroom interaction during teaching practicums, but also found ways to monitor and anticipate teacher-pupil events,

thus facilitating situations for learning professional agency in the classroom. Accordingly, it seems that classroom interaction is truly a key context and resource for both early-career teachers' learning of professional agency in the classroom and the negative experiences of having inadequate skills, which may result in either negative or positive cycles affecting their motivation to learn, self-efficacy for learning and strategies for active skilful learning in the classroom.

6.3 Educational implications

Learning professional agency in the classroom entails facing both positive situations of successful interaction that promotes pupils' learning and challenging situations in which unexpected events may cause a troubled mind for the early-career teacher (Soini et al., 2010; Spilt et al., 2011). The results of this study indicated that during the early years in the teaching profession, if the teacher is uncertain of her/his selection of profession, the balance between rewarding and draining experiences in the classroom may waver, which may then further hinder their professional agency in the classroom. Thus, turnover intentions and their effect on early-career teachers' emotional experiences in classroom interaction need to be acknowledged and discussed not only in schools but even during the teacher education program. The results showed that almost one third of the early-career teachers had considered leaving the profession, which indicates a moderately common yet truly sensitive subject to reflect on together. Hence, teacher educators, mentoring programs and school leadership are all responsible for creating safe environments for conversations during which the experiences that both trigger and buffer turnover intentions can be expressed (Fresko & Alhija, 2015). The results of this thesis emphasized that these discussions could be directed towards considering how those experiences and turnover intentions affect early-career teachers' learning of professional agency in the classroom.

The results of this thesis further showed that inadequacy experienced in teacher-pupil interaction was negatively associated with early-career teachers' professional agency in the classroom. This highlights the complexity of early-career teachers' learning in classroom interactions and the need for various strategies that facilitate situations suitable for learning professional agency in the classroom. Thus, it is important to pay attention to the functionality of classroom interaction and learning to promote it in teacher education. Furthermore, visiting other teachers' classrooms and co-teaching during the few first years in the profession could provide opportunities to share experiences, learn from others, reflect one's own experiences to others, and receive and provide emotional support (in de Wal, den Brok, Hooijer, Martens, & van den Beemt, 2014; Väisänen, 2019). For example, exchanging looks with a peer and seeing her/his reaction (e.g., raising eye brows) may be enough for a teacher to realize the difficulty and complexity of the situations and thus instead of attributing failure to having inadequate skills create space

for taking a motivated, confident and reflective stance towards the situation and pupils' needs. Thus, co-teaching with more advanced teachers could create favourable interaction and suitable opportunities for learning professional agency in the classroom in terms of becoming motivated, self-efficacious and skilful in using other teachers and pupils as resources for learning (Thomas et al., 2019). Such intense collaboration during teacher education and mentoring programs could be supplemented with discussions on the role of accountable others in learning professional agency in the classroom.

Mentoring and other forms of support offered during teacher education and the early years in teaching have been shown to contribute to early-career teachers' learning and wellbeing (Tynjälä et al., 2019; Väisänen, 2019). Furthermore, teachers' capacity to learn actively and skilfully by building safe and functional professional relationships and promoting a climate of trust and reliance in the professional community facilitates their learning of professional agency in the classroom (Pietarinen et al., 2016). Thus, mentoring programs and the social support systems need to take into account the capacity of professional communities to learn to deal with difficult teacher-pupil relationships and facilitate collective efficacy beliefs enhancing teachers' learning. This may especially contribute to early-career teachers' learning of professional agency in the classroom. This requires school leadership that facilitates multi-professional interactions focusing on both the pupil's and the early-career teacher's learning needs, provides a safe environment for learning from other teachers and supports active experimenting with novel practices in the classroom (e.g., Eteläpelto et al., 2015; Mena et al., 2017).

According to the findings from this thesis, teacher education seems to succeed in providing early-career teachers with suitable environments for learning professional agency in the classroom. However, there are some aspects of teacher education pedagogy that need to be considered in light of the results. The findings highlight that instead of merely becoming able to adopt to requirements of teacher-pupil interaction, early-career teachers need to learn intentionally and confidently to use pupils and other teachers as resources for renewing and adapting their classroom practices and the learning environment. However, ideas and theories presented to early-career teachers in academic courses are not always helpful to them for facing the realities of classroom interaction. Thus, facilitating early-career teachers' learning of professional agency requires versatile opportunities for analysing classroom interaction situations that demonstrate a teacher's professional agency. They will also need secure opportunities to practise informed and intentional responses by adapting classroom situations suitable for learning professional agency. These could be combined with support for seeing the outcomes of learning professional agency as one's growing capacity to produce collaborative and meaningful learning intentionally with others in the classroom (Scardamalia, 2002; Scardamalia & Bereiter, 1991).

Along with prior studies, the results from this thesis showed that early-career teachers are motivated and able to learn by actively and intentionally observing other teachers during teacher education (e.g., Mena et al., 2017). Such learning from peers and more advanced teachers is supported by the pedagogical approaches applied in Finnish teacher education programs that include various forms of monitoring peers and teacher educators, practising teaching with pairs and learning in peer groups. However, options for early-career teachers to learn professional agency in the classroom by co-teaching with more experienced teachers are rarely provided. Such opportunities for active reciprocal learning with teacher educators in the classroom would reflect the conceptions and visions of teaching and learning in the classroom that early-career teachers construct during coursework. This could result in novel tools or ways for the co-teacher to interact during teaching, to create the required safety, space and time for early-career teachers to learn professional agency in the classroom. It could function as a scaffolding method providing early-career teachers the strategies for informed, intentional and autonomous responses to pupils' needs in challenging classroom situations, further facilitating learning of professional agency in the classroom. Teacher educators need to open up their own classrooms and model pedagogy and teacher autonomy that are not sensitive to others within the school or university, but rather demonstrate motivation, self-efficacy and strategies for active learning from colleagues and early-career teachers.

6.4 Future research

This thesis contributed to our understanding of early-career teachers' professional agency in the classroom; how it is challenged during the first years and how it is learned during teacher education. However, there are aspects that need further exploration and some novel questions that can guide future inquiries.

The selection of students into teacher education programs plays a key role in determining the orientation and commitment by future teachers to the teaching profession. The entrance examinations ought to be capable of selecting early-career teachers who will value teaching as a demanding, complex and dynamic profession that continuously requires active intentional learning with pupils and other teachers. The findings from this study point to the need to investigate the push and pull of the teaching profession in Finland more deeply (e.g., Rinke & Mawhinney, 2017). For example, the reasons behind considering whether to stay or leave the profession may have different effects on early-career teachers' learning of professional agency in the classroom even during teacher education, which calls for more qualitative studies. There are also signs of a decline in the number of applicants for Finnish primary school teacher education (Finnish National Agency for Education, 2017), and the entrance exams have been criticized for not predicting study success during teacher education and for biased favouring of older and male

applicants (Kupiainen, Marjanen, & Ouakrim-Soivio, 2018; Mankki, Mäkinen, & Räihä, 2019). The development of the selection criteria and the selection processes require further research on how different intentions and orientations to the teaching profession are related to learning professional agency in the classroom during teacher education and later in the profession.

Moreover, meaningful learning experiences at the end of teacher education that lead to security in the chosen profession, facilitate early-career teachers' learning of professional agency and construct their commitment could be explored. For example, practical experiences of being able to transform classroom practice according to one's beliefs and visions constructed during course work and interpretations of classroom practice could accelerate the development of teachers' sense of self as a professional teacher, thus buffering the transition shock experienced when entering the profession (Lindqvist et al., 2017). Following early-career teachers longitudinally over the transition from teacher education to the work force could inform us on the meaning that those learning experiences have for their professional agency in the classroom later in their career.

The results from this thesis shed light on the complex process of learning professional agency in the classroom during teacher education. However, self-report methods were used and further research on the behavioural changes that learning professional agency in the classroom accumulates in the actions of early-career teachers is needed. For example, observations or videos, together with interviews, could inform us on how early-career teachers' capacity to reflect actively in the classroom is related to their behavioural efforts in intentional learning from and with others in the classroom. Applying observation tools and using them as a stimulus during interviews, could be especially interesting in examining the contextual modes of professional agency in the classroom and how they interact, perhaps even in situation-specific ways (Vermunt & Donche, 2017). Longitudinal behavioural data for investigating the modes of early-career teachers' professional agency in the classroom and how they develop over the transition from teacher education to working as a teacher is needed.

The results also showed that the instructional strategies that early-career teachers apply in classroom interaction may determine the suitability of the situations for learning professional agency in the classroom. More information is needed on how the situations evolve and what precedes them when early-career teachers are able to adapt their script of the lesson according to pupils' initiatives and learning needs. Deeper understanding is also required on the borders that prevent such adaptive actions, how they are structured in teaching practice and whether teacher educators are able to provide opportunities and freedom for early-career teachers to cross them and experiment with novel ideas. Accordingly, future research on how teachers learn to keep an eye on pupils' learning and how that promotes the learning of professional agency in the classroom, especially during teacher education and the first years in the profession, could provide a means for supporting

all teachers in active, intentional and skilful learning in the classroom (Wolff et al., 2015).

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Appendix A The scales and items used to explore the relationships between early-career teachers' sense of professional agency in the classroom and perceived inadequacy in teacher-pupil interaction

Teacher's professional agency in the classroom & Inadequacy in teacher-pupil interaction scales	Cronbach's α
Collaborative environment and transformative practice (CLE)	.82
Cle11: I've been able to build functioning interactive relationships with my pupils	
Cle12: I'm able to create a nice atmosphere together with my students	
Cle13: When planning my work, I'm able to utilize the feedback I get from my pupils	
Cle14: I can modify my teaching to adjust to different groups of pupils	
Cle15: I'm able to find teaching methods to engage even the most challenging groups of pupils	
Cle16: I'm able to find ways to support the learning processes of all my pupils	
Reflection in classroom (REF)	.61
Ref21: I still want to learn a lot about teaching	
Ref22: I'd like to understand young people's ways of thinking and acting better	
Ref23: I regularly endeavour to estimate my success in teaching situations	
Ref24: I think we can all learn something in a teaching situation	
Inadequacy in teacher-pupil interaction (INAD)	.76
Inad11: The challenging pupils make me question my abilities as a teacher	
Inad12: I often feel I have failed in my work with pupils	
Inad13: Dealing with problem situations considering my pupils often upsets	

Note: The item scale: completely disagree 1 2 3 4 5 6 completely agree 7.

Appendix B The scales and items used for investigating early-career teachers' sense of professional agency in the classroom during teacher education

Student teacher's professional agency in the classroom scale	Cronbach's α		
	T1	T2	T3
Reflection in classroom (REF)	.69	.67	.68
Ref1: In my work it is important to develop as a facilitator of pupils' overall growth.			
Ref2: I'd like to understand young people's ways of thinking and acting better.			
Ref3: I think we can all learn something in a teaching situation.			
Ref4: I can learn from my failures.			
Ref5: I regularly endeavour to estimate my success in teaching situations.			
Modelling (MOD)	.79	.89	.85
Mod1: I learn innovative teaching methods by observing them in different teaching situations.			
Mod2: I learn functional teaching methods by observing experienced teachers' teaching.			
Collaborative learning environment (CLE)	.84	.85	.82
Cle1: I'm able to create a nice atmosphere together with my students.			
Cle2: I'm able to find teaching methods to engage even the most challenging groups of pupils.			
Cle3: I'm able to find ways to support the learning processes of all my pupils.			
Cle4: I am satisfied with my present pedagogical practices.			
Cle5: I've been able to build functioning interactive relationships with my pupils.			
Cle6: I can modify my teaching to adjust to different groups of pupils.			
Cle7: I feel more and more successful in my teaching.			
Cle8: I am able to utilise pupils' feedback when planning my teaching.			
Competence (COM)	.87	.82	.80
Com11: I am able to support the construction of pupils' understanding in my teaching.			
Com12: I am able to utilise different teaching methods according to various contents of teaching.			
Com13: I am able to evaluate the suitability of different teaching methods to different subject contents.			
Com14: I can develop new pedagogical practices in my teaching.			
Com15: I can analyse my professional practice as a whole.			

Note: The item scale: completely disagree 1 2 3 4 5 6 completely agree 7.

ORIGINAL ARTICLES

ARTICLE I

Heikonen, L., Pietarinen, J., Pyhältö, K., Toom, A., & Soini, T. (2017). Early-career teachers' sense of professional agency in the classroom: Associations with turnover intentions and perceived inadequacy in teacher–student interaction. *Asia-Pacific Journal of Teacher Education, 45*(3), 250-266. doi.org/10.1080/1359866X.2016.1169505

ARTICLE II

Heikonen, L., Pietarinen, J., Toom, A., Soini, T, & Pyhältö, K. (2020). The development of student teachers' sense of professional agency in the classroom during teacher education. *Learning: Research and Practice*. doi.org/10.1080/23735082.2020.1725603

ARTICLE III

Heikonen, L., Toom, A., Pyhältö, K., Pietarinen, J., & Soini, T. (2017). Student-teachers' strategies in classroom interaction in the context of the teaching practicum. *Journal of Education for Teaching*, 43(5), 534-549. doi.org/10.1080/02607476.2017.1355080