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Academics' transformative learning at the interfaces of pedagogical and discipline-specific communities

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Abstract

Developing the quality of teaching as a part of organisational transformations requires identifying effective ways to harness academics' activities in pedagogically oriented and discipline-specific communities of practice. This dissertation examines how academics' activities at the interfaces of these two communities can contribute to the processes of pedagogical development. Transformative learning theory is applied to examine the processes of pedagogical development from two perspectives: developing as a teacher and acting as an informal pedagogical change agent.

The dissertation consists of four separate but interrelated sub-studies (I–IV). The participants were 23 engineering educators that lack an institutionalised developer or leadership position. At the time of data collection, the participants had completed at least 10 ECTS (European Credit Transfer and Accumulation System, Studies I–II) or 25 ECTS (Studies III–IV) of pedagogical development studies. The data were collected with semi-structured interviews in a Finnish technical university before and during a period of organisational transformation. The data comprised of interviews with 10 participants before the transformation in 2009 and longitudinal interviews with another 13 participants during a three-year period of organisational transformation in 2011–2013. The data were analysed by means of qualitative content analysis.

The dissertation culminates in a theoretical conceptualisation and an empirical model of 1) pedagogically oriented and discipline-specific communities of practice as a network that enables transformative learning related to developing as a teacher and 2) brokering as a way of acting as an informal pedagogical change agent at the interfaces of academic communities of practice. The findings suggest that universities could harness informal change agency to create connections between academics' transformative learning experiences in pedagogically oriented and discipline-specific communities of practice as well as the organisational objectives of developing the quality of teaching.

Keywords: brokering, change agency, communities of practice, pedagogical development, transformative learning

Maria Clavert

Yliopiston opettajien transformatiivinen oppiminen pedagogisten ja alakohtaisten käytäntöyhteisöjen rajapinnoilla

Tiivistelmä

Opetuksen laadun kehittäminen osana organisaatiouudistuksia edellyttää tehokkaita tapoja hyödyntää yliopiston opettajien toimintaa pedagogisissa ja alakohtaisissa käytäntöyhteisöissä. Tässä tutkimuksessa tarkastellaan, kuinka yliopiston opettajien toiminta pedagogisten ja alakohtaisten yhteisöjen rajapinnoilla edistää pedagogisia kehitysprosesseja. Transformatiivisen oppimisen teoriaa hyödynnetään pedagogisten kehitysprosessien tarkastelussa sekä opettajana kehittymisen että epävirallisena opetuksen muutosagenttina toimimisen näkökulmista.

Tutkimus koostuu neljästä erillisestä, toisiinsa liittyvästä osatutkimuksesta (I–IV). Osallistujat olivat 23 insinööritieteiden yliopiston opettajaa, joilla ei tutkimuksen alkaessa ollut virallista kehittäjän tai esimiehen asemaa organisaatiossa. Aineistonkeruun aikaan osallistujat olivat suorittaneet vähintään 10 opintopistettä (osatutkimukset I–II) tai 25 opintopistettä (osatutkimukset III–IV) pedagogisia opintoja. Aineisto kerättiin puolistrukturoiduilla haastatteluilla suomalaisessa teknillisessä yliopistossa ennen organisaatiouudistusta sekä sen aikana. Haastatteluaineisto koostui 10 osallistujan haastattelusta ennen organisaatiouudistusta vuonna 2009 sekä toisten 13 osallistujan pitkittäisistä seuranta-haastatteluista kolmivuotisen organisaatiouudistusjakson aikana vuosina 2011–2013. Aineiston analyysi perustui laadulliseen sisällönanalyysiin.

Tutkimuksen tuloksena esitetään teorettinen ja empiirinen malli koskien 1) pedagogisia ja alakohtaisia käytäntöyhteisöjä opettajana kehittymiseen liittyvän transformatiivisen oppimisen mahdollistavana verkostona ja 2) ‘brokering’-toimintaa epävirallisena opetuksen muutosagenttiutena akateemisten käytäntöyhteisöjen rajapinnoilla. Tulosten mukaan yliopistot voivat hyödyntää epävirallista muutosagenttiutta luomaan yhteyksiä opettajien pedagogisissa ja alakohtaisissa käytäntöyhteisöissä syntyvien transformatiivisten oppimiskokemusten sekä yliopiston opetuksen laadun kehittämistavoitteiden välille.

Avainsanat: brokering-toiminta, käytäntöyhteisöt, muutosagenttiutus, pedagoginen kehittyminen, transformatiivinen oppiminen

Acknowledgements

“It has been difficult to say which ones of us are doing an amazing job. Often it has been revealed in a funny way that a colleague was actually doing amazingly valuable work and that we all should have learned from that. But as it turns out: nobody knew! Maybe we need to search harder to find these academics.” (Participant’s description of pedagogical change agency in 2011)

I would like to take this opportunity to express my gratitude to the participants of this dissertation. Thank you for dedicating your time to the interviews and sharing your experiences of pedagogical development and change agency with me.

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Espoo, November 14th 2017

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List of original publications

This dissertation is based on the following four original publications, which are referred to in the text as Studies I–IV:

I Clavert, M. & Nevgi, A. (2011). Yliopistopedagogisen koulutuksen merkitys yliopisto-opettajana kehittymisen kokemuksessa. [The role of university pedagogical training in the experience of developing as a university teacher.] *PedaForum*, 11(2), 6–16.

II Clavert, M., Björklund, T., & Nevgi, A. (2014). Developing as a teacher in the fields of science and technology. *Teaching in Higher Education*, 19(6), 685–696.

III Clavert, M., Löfström, E., & Nevgi, A. (2015). Pedagogically aware academics' conceptions of change agency in the fields of science and technology. *International Journal for Academic Development*, 20(3), 252–265.

IV Clavert, M., Löfström, E., Niemi, H., & Nevgi, A. (manuscript submitted for publication). Change agency as a way of promoting pedagogical development in academic communities: a longitudinal study.

1 Introduction

In the face of organisation-wide transformations, such as curriculum reforms, pedagogical development is increasingly seen as a shared endeavour among all members of academic communities (Annala & Mäkinen 2016) rather than a task limited to institutionalised change agents (see Caldwell 2003), such as professional developers, department heads, deans, and pro-rectors. In contrast to institutionalised change agents, most professors, lecturers, and researchers lack a formal mandate for promoting pedagogical development beyond their own courses. For these academics, the processes of pedagogical development are situated at the interfaces of two intertwined academic communities: pedagogically oriented and discipline-specific communities.

In order to contribute to pedagogical development at the university level, academics need to act as '*informal pedagogical change agents*' (see McGrath 2017) by harnessing the pedagogical development opportunities at the community interfaces. While previous studies have acknowledged the interrelationship of academics' activities associated with pedagogically oriented development communities and the development of teaching practices situated in departmental, discipline-specific communities (Warhurst 2006), further research is required in order to explore how academics' experiences of taking part in pedagogical development communities could be translated into practice in local discipline-specific communities (see Remmik et al. 2011; McGrath 2017). This dissertation fills this gap by identifying *how academics' activities and experiences at the interfaces of pedagogically oriented and discipline-specific communities can contribute to processes of pedagogical development*. Once identified, these informal activities and experiences may present a wider range of organisational development possibilities than institutionalised forms of pedagogical development alone could do (see also Mårtensson & Roxå 2016).

The dissertation aims to develop a theoretical conceptualisation and an empirical model of academics' pedagogical development processes at the interfaces of pedagogically oriented and discipline-specific communities as well as shed light on how universities can harness these processes in a context of organisational transformations. Pedagogically oriented and discipline-specific academic communities are conceptualised from the perspective of *communities of practice* (see Wenger 1998) that consist of three features: mutual engagement, a joint enterprise and a shared repertoire. Processes of pedagogical development at the interfaces of academic communities are explored from the perspectives of developing as a teacher and acting as an informal change agent. Academics' experiences of developing as a teacher are conceptualised from the perspective of *transformative learning* (see Mezirow 1997, 2000), which is aimed at transform-

ing the meaning perspective that guides pedagogical activities in academic communities. Academics' experiences of acting as an informal change agent are explored from the perspective of *brokering* (Wenger 1998, 2000) as a way of promoting pedagogical development by mediating at the interfaces of academic communities without an institutionalised leadership or developer position.

The findings of this dissertation are based on a set of four qualitative sub-studies (Studies I–IV) that were conducted in a Finnish university before and during a three-year period of organisational transformation. Studies I and II examine academics' experiences of developing as a teacher arising from participation in pedagogical development courses while working in discipline-specific communities of practice before the organisational transformation. Study III explores academics' experiences of acting as informal change agents at the interfaces of pedagogical and discipline-specific communities of practice before and during the first year of organisational transformation. Study IV supplements the findings of Study III with a longitudinal follow-up setting that affords an exploration of the manifestations of informal change agency as well as its organisational possibilities and constraints during a three-year period of organisational transformation.

In all four studies, the organisational higher education context is explored from the perspective of individual academics and reflected in the context-specific possibilities and limitations that the participants identify as a part of their pedagogical development experiences. The participants in all four studies represent the field of engineering education. The studies do not focus on the nature of educational change (see e.g. Hargreaves et al. 2014) and nor do they explore how the differences in the academics' demographic backgrounds possibly affect their perception. Instead, the studies describe a repertoire of activities through which academics develop themselves as teachers and act as pedagogical change agents. The investigation is limited to academics that lack an institutionalised developer or leadership position.

1.1 Pedagogical development in academic communities of practice

Universities can be understood as entities consisting of many *communities of practice* typically gathered around common activities of research and teaching (Hanrahan et al. 2001; Brew 2002; Warhurst 2006, 2008; Winberg 2008). Originating from the work of Lave and Wenger (1991) and further developed by Wenger (1998, 2000), the conception of a community of practice describes how common activities form a social system where learning is situated in shared practices, ways of making meaning of experiences, identity formation, and ways of belonging. According to Wenger (1998), a community of practice is an informal organisational sub-culture that is not necessarily congruent with the for-

mal organisational structure. It consists of members that contribute to the joint endeavour, such as teaching and research, by utilising a shared repertoire of common resources, aligning with commonly accepted practices and patterns of thinking, and sharing a vision of the community's future (Wenger 1998).

As social systems, communities of practice share elements with other frameworks of social learning. For example, activity systems (see Engeström 2000, 2007) are also driven by communal motives embedded in an object of joint activities. In addition to communities, objects and individual subjects, activity systems consist of tools, rules, and division of labour that are typical for most communities of practice. While the cultural historical theory of activity systems focuses on a "zone of proximal development" between the historical state of an activity and the developmental stage of a person with respect to that (Engeström 2000), the conception of a community of practice places emphasis on learning as the production of identity in a process of social participation in shared practices of local communities (Wenger 2009, 2010). As such, the conception of a community of practice provides a fruitful basis for exploring individual experiences of pedagogical development resulting from participation in academic communities.

In the higher education context, McDonald and Star (2006) have noted that the traditionally autonomous teaching culture, often referred to as 'academic freedom', might not support the communal, collaborative practices typical of communities of practice. In addition, the hierarchical organisation structure and power relations, typical of higher education institutions, might hinder the creation of informal communities of practice (Wenger 2010). Remmik et al. (2011) point out that university communities differ from each other in terms of their goals and impact, and hence not all academic communities might be what Wenger (1998) identifies as communities of practice. However, the conception of communities of practice with an identifiable location, boundaries and membership criteria provides a fruitful framework for exploring experiences of pedagogical development in the field of higher education (see also Wenger 2010).

As noted by Warhurst (2006) and Remmik et al. (2011), academic communities of practice can be divided into pedagogical and discipline-specific communities. The discipline-specific community is typically a research group, laboratory, or any other unit within which academics of the same discipline or field of research conduct their daily practices of teaching and research. The community is often aligned with the organisational structure and tends to be rather permanent in nature. Membership in a discipline-specific community typically begins with apprenticeship-like participation as a student or a postdoctoral researcher and includes socialisation into the cognitive as well as cultural processes, such as pedagogical traditions, of the community (Nersessian 2006). Novice academics typically inherit courses to teach, including all teaching materials, from their professors and are likely to teach the courses by replicating the way they were

taught in their own studies (Warhurst 2008). Both Warhurst (2008) and Remmik et al. (2011) state that having no previous pedagogical training or teaching experience, novice academics are drawn to identify themselves primarily as disciplinary researchers with teaching responsibilities rather than as teachers.

Pedagogical communities of practice are built around relationships established through largely voluntary participation in common pedagogical activities, such as in-service training programmes and conferences for pedagogical development in higher education (see also Warhurst 2006; Remmik et al. 2011). These communities consist of a heterogeneous group of pedagogically oriented academics from various discipline-specific communities beyond administrative and structural divisions. The pedagogical community members are simultaneously members of a discipline-specific community and share similar interests in developing the quality of teaching.

As also noted by Remmik et al. (2011), academics in pedagogical communities of practice are exposed to pedagogical meanings and practices that might differ from their disciplinary teaching traditions. Roxå and Mårtensson (2009) state that academics may turn to their pedagogically oriented colleagues to discuss teaching and make interpretations on university policies, such as organisational transformations. Compared to memberships in discipline-specific communities of practice that have evolved around highly permanent research and teaching responsibilities, pedagogically oriented community memberships might be more transient and follow the lifecycle of pedagogical development projects. In a study on the impact of a special type of pedagogical community of practice, namely the 'faculty learning community', Cox (2013) discovered that just one year's participation in the community was sufficient to cultivate novice academics' interest in developing the quality of teaching and learning in their discipline-specific communities.

Development of pedagogical and discipline-specific communities of practice is based on negotiation of meaning related to what constitutes competence for the community members (Warhurst 2006). Wenger (2000) defines negotiation of meaning as an interplay between community members' social competence and their personal experiences that together define the boundaries of the community. It involves direct participation in shared practices, activities, and conversations as well as producing physical and conceptual artifacts, such as tools, methods, documents, and other forms of reification that reflect shared experiences resulting from the direct participation.

A growing body of research has highlighted collegial negotiation of meaning as a source of pedagogical development in higher education (Warhurst 2006; Remmik et al. 2011; Mårtensson 2014) and a determinant of how organisational reforms are interpreted and applied in universities (Knight & Trowler 2000; Merton et al. 2009; Annala & Mäkinen 2016). If the disciplinary community is perceived as supportive of open pedagogical dialogue, academics may expand

the dialogue across other relevant communities of practice (Roxå & Mårtensson 2009), resulting in the emergence of new pedagogical meanings within the disciplinary community (Warhurst 2006). Annala and Mäkinen (2016) emphasise the importance of creating connections across the borders of academic communities to enable pedagogical dialogue and development at an organisational level.

While acknowledging the importance of dialogue in pedagogical development, previous studies call for further research to explore the transfer of new pedagogical conceptions into the practices of disciplinary communities (Remmik & Karm 2012) as well as the interrelationship of activities associated with pedagogically oriented development communities and the development of teaching practices situated in departmental, discipline-specific communities (Warhurst 2006). For example, McGrath (2017) found that universities lack formal structures for translating academics' development interests resulting from taking part in pedagogical development courses into practice in local discipline-specific communities (see also Remmik et al. 2011).

1.2 Teacher development as transformative learning in academic communities

Development as a university teacher entails an increased understanding of effective ways to facilitate student learning (Åkerlind 2007). This understanding, often referred to as scholarship of teaching and learning, results from reflection within three domains of teaching knowledge: curricular, pedagogical, and instructional knowledge (Kreber & Cranton 2000). A wide body of previous research has explored the development process in the context of pedagogical development courses and workshops (Ho, Watkins, & Kelly 2001; Gibbs & Coffey 2004; Hubball, Collins & Pratt 2005; Stes, Coertjens & van Petegem 2010; Postareff & Nevgi 2015). These studies have reported the positive effects of pedagogical development courses on the development of new pedagogical concepts (Gibbs & Coffey 2004) and strengthened self-efficacy beliefs related to teaching (Postareff, Lindblom-Ylänne, & Nevgi 2007, 2008). New pedagogical concepts are needed to replace potentially outdated and ineffective disciplinary teaching practices and, consequently, to improve the quality of teaching and learning at the university level. It should be noted, however, that not all new pedagogical conceptions are suitable for all disciplinary contexts or automatically better than the previously held assumptions on good teaching (see e.g. Lindblom-Ylänne et al. 2006).

Development as a teacher requires transfer of new pedagogical concepts between centralised pedagogical development courses and the local contexts of teaching (see e.g. Ho 2000; Hanrahan et al. 2001; Knight 2006; Warhurst 2006; Ginns, Kitay, & Prosser 2010). Previous studies have widely agreed that opportunities for applying new pedagogical concepts in practice are greatly dependent

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on the nature, practices, and attitudes of local discipline-specific communities (Stes, Clement, & Petegem 2007; Ginns, Kitay, & Prosser 2010; Remmik 2013). Particularly if the new pedagogical concepts, such as student-centred approaches to teaching, differ significantly from the disciplinary teaching traditions (see e.g. Winberg 2008), participants might be drawn to query the feasibility of the new concepts and methods of teaching (Guskey 2002) or apply the new methods mechanically or only partially (Ho, Watkins, & Kelly 2001).

As described by Kreber (2006), scholarship of teaching and learning may be developed through transformative learning resulting from academics' activities between pedagogical and discipline-specific communities of practice. In contrast to learning in formal educational contexts, such as pedagogical development programmes, academics' experiences of learning in communities of practice are often informal, collective and hidden in an interplay of practice and identity production (see Wenger 2010). The cognitive-rational approach to *transformative learning*, advanced by Mezirow (1991, 2000), has dominated studies of professional development and adult education (see e.g. Cranton 2000; Taylor 2000). The theory examines learning as transformation in a meaning perspective that guides the behaviour of an adult. In a context of organisational transformation, new behaviour is often needed to meet the requirements of the new organisational environment (see e.g. Whitchurch 2008). According to Mezirow (2000), a meaning perspective consists of a collection of meaning schemes related to specific activities, such as teaching. The meaning schemes are adopted in a process of socialisation to a certain socio-cultural context, remain unrecognised in daily life, and guide the interpretation of new information so that it fits the meaning perspective.

The transformative learning process is triggered by a conceptual conflict that reveals incongruent meaning schemes and encourages critical reflection on them (Mezirow 2000). For example, participation in a pedagogical development course might reveal a need to replace or modify previously held pedagogical meaning schemes with more effective conceptions of teaching. In their study of teacher development in a pedagogical development course, Postareff and Nevgi (2015) identified both groups of participants that developed their conceptions of teaching during the training and a group of participants that held strong opinions and attitudes about teaching and were less likely to change their understanding or practices during the training. It is also possible that the latter group of participants did not consider the presented conceptions of teaching as relevant or compatible with their experiences of disciplinary teaching. Instead of accepting pedagogy as a new field of expertise and their position as novices regarding the field, the latter group of participants resisted the new pedagogical conceptions throughout the course. These findings were confirmed in a longitudinal study on how the teacher identities of academics develop in a research-intensive environment when supported through a sustained pedagogical development pro-

gramme (Nevgi & Löffström 2015). By following a group of voluntary participants within the programme, Nevgi and Löffström (2015) discovered that having a critical attitude towards disciplinary teaching traditions and strong motivation to improve one's own teaching by applying theoretical knowledge to teaching and learning anticipated the development of a reflective teacher identity.

Without the willingness to accept their vulnerability as a point of departure for developing as a teacher, academics may use defence mechanisms to avoid the emotional and social consequences of a conceptual conflict (see Cranton 2000; Baumgartner 2001) during pedagogical training (Nevgi & Löffström 2015). For example, questioning the disciplinary teaching traditions may involve a fear of revealing one's professional weaknesses as a teacher and consequently losing social acceptance among other discipline-specific community members. By establishing social relations with the members of a pedagogical community of practice, such as the other participants of a pedagogical development course, academics can diminish the social threat related to developing as a teacher (see also Remmik et al. 2011) through transformative learning.

Academics' opportunities for building commitment to new pedagogical concepts are dependent on testing the new conceptions in practice within the local discipline-specific community (Ho 1998, 2000). In order to be successful, the pedagogical development efforts must be aligned with and supported by the local discipline-specific cultures (Hanrahan et al. 2001; Warhurst 2008; McAlpine et al. 2009). Perceptions of low support from superiors and colleagues reduce academics' motivation for pedagogical experimentation (Ginns, Kitay, & Prosser 2010; Remmik et al. 2011), whereas receiving positive feedback from students, colleagues, and superiors supports the development process (Ho 2000; Guskey 2002). If the transformative learning process is interrupted, academics are also likely to preserve the dysfunctional or ineffective disciplinary teaching traditions and return to the previous stage of development. However, if the new teaching practices are found to have value, the learning process continues by incorporating the new pedagogical concepts into the personal meaning perspective (see also Mezirow 2000).

The stage of experimenting with new student-centred teaching methods adopted from the pedagogically oriented development community involves contextual (see Baumgartner 2001) and action-related (see Taylor 2000) dimensions of transformative learning. Developing new teaching practices or modifying existing practices to improve students' learning outcomes indicates a successful process of developing as a teacher in a discipline-specific community.

The stages of the transformative learning process have similarities with other theories of adults' learning, such as the idea of expansive learning in organisational activity systems (see Engeström 2000). Both processes of transformative and expansive learning entail questioning the existing practices and analysing the contradictions and disturbances related to them, modelling a vision for possible

development, testing the new model and, if deemed valuable, implementing the model in practice (see Engeström 2000; Mezirow 2000). Transformative learning theory also has similarities to the social theory of learning (see Wenger 2000) in that both theories emphasise contradictions and discontinuities as a source of learning and development. Applied in a context of communities of practice, transformative learning theory enables identifying socially, practically, emotionally, cognitively, and contextually meaningful learning experiences that are triggered by social participation in joint practices and result in individual transformation.

1.3 Change agency as a way of promoting pedagogical development in academic communities

A growing body of research has applied transformative learning theory to examine collective development at the group and organisational level (Baumgartner 2001; see also Yorks & Marsick 2000). As noted by Kasl and Elias (2000), collective transformative learning may occur in response to changes in the organisational environment during a period of organisational transformation, such as a merger or a curriculum reform. Critical reflection can be applied at the community level to reach a shared understanding of the reorganised work environment and to clarify a mission for the whole community (Kasl & Elias 2000).

The task of promoting collective development through transformative learning is concerned with questions of authority for making changes to the shared system of teaching and learning (see also Yorks & Marsick 2000). For example, Mårtensson and Roxå (2016) point out that the complexity of structural issues related to pedagogical development often exceeds individual academics' personal agency to bring about change (see also Hanrahan et al. 2001; Roche 2001; Smyth 2003; Adams & Felder 2008; McGrath 2017). Due to the challenges of authority and complexity, organizational development responsibilities are often assigned to instructional development programmes (Felder, Stice, & Rugarcia 2000) and academics with an institutionalised developer status, such as faculty developers (Fletcher & Patrick 1998), educational developers (Knight & Wilcox 1998), academic staff developers (Ho 2000; Smyth 2003), and professional developers (Roche 2001).

As noted by Whitchurch (2008), some development professionals are active in extending their roles beyond given job descriptions and collaborating with academics without formal developer or any other specialist status. On the other hand, some academics are recruited to dedicated appointments that involve formal development responsibilities or they are involved in cross-functional development projects, such as writing a funding application, which involve both professional developers and academics without a formal developer status (Whitchurch 2008). In addition, most universities have appointed institutional-

ised academic leaders to focus on and take responsibility for initiating and managing organisational transformation (Knight & Trowler 2000; Ylijoki & Ursin 2013).

As university transformations are increasingly influencing all levels of the organisation (see e.g. Macfarlane & Chan 2014), the task of promoting transformative learning can be regarded as a shared responsibility of professional developers, academic leaders, and academics without a formal developer or leadership position. Some previous studies have highlighted a need to understand the role of all academics in the capacity of organisational *change agents* (Roche 2001; Borrego, Froyd, & Hall 2010) and to explore their opportunities of promoting pedagogical development at the organisational level (Macfarlane & Chan 2014; McGrath 2017). For example, Åkerlind (2005) has identified the activity of promoting pedagogical development in academic communities as an integral part of academics' professional development. Further, in their studies on novice university teachers' professional learning, both Warhurst (2006) and Remmik and Karm (2012) identified a group of academics that focused their development efforts on modifying the disciplinary teaching traditions. In a study on disseminating teaching innovations in engineering education, Borrego, Froyd, and Hall (2010) found that academics' disciplinary networks provided an efficient communication channel for spreading new pedagogical ideas. Mårtensson (2014) and McGrath (2017) identified academics' collegial dialogue in significant professional networks as a source of developing the community-level teaching practices.

This dissertation aims to describe the full repertoire of activities through which academics act as pedagogical change agents at the interfaces of pedagogically oriented and discipline-specific communities of practice. The dissertation contributes to knowledge about the nature of this repertoire and how it unfolds in the context of organisational transformation that may impose both restricting and enabling features on academics' change agency. In contrast to institutionalised forms of change agency (see e.g. Caldwell 2003), the investigation is limited to academics that lack an institutionalised developer or leadership position and are simultaneously members of both discipline-specific and pedagogical communities.

1.3.1 Change agency as a way of promoting transformative learning

Simultaneous membership in both pedagogical and discipline-specific communities of practice provides academics with an opportunity to act as change agents by importing new pedagogical conceptions from the pedagogical to the disciplinary community. Exposure to these new pedagogical concepts can trigger transformative learning (see Mezirow 2000) among disciplinary community members. While the activities of promoting collective transformative learning have

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also been emphasised in previous studies of transformational (see e.g. Hallinger 2003) and transformative (see e.g. Shields 2010) leadership, this study focuses on academics without an institutionalised leadership status and positions them as informal pedagogical opinion leaders in their local disciplinary communities (see also Borrego, Froyd, & Hall 2010). In order to promote transformative learning among their disciplinary colleagues, academics need an internal mandate to suggest pedagogical changes that are seen as important for the disciplinary community at large (see also Mårtensson 2014).

Acting as informal change agents, academics may adopt development practices typical of institutionalised forms of local pedagogical leadership (see e.g. Gibbs, Knapper, & Piccinin 2008). For example, encouraging discussion and helping others to achieve their full potential have been identified as effective ways of promoting pedagogical development for both informal and institutionalised leaders (Mårtensson & Roxå 2016). Pielstick (2000) found that in comparison to formal leaders, organisation members with an internal development mandate demonstrated higher levels of development activities related to promoting a shared vision and developing a shared community, encouraging dialogue, and providing guidance for others. In fact, the lack of a formal leadership or developer status may provide access to parts of organisational networks that are difficult for formal leaders or developers to reach (Hannah & Lester 2009). It may also result in a wider range of organisational development opportunities than an institutionalised decision-making position alone could do (Pielstick 2000; Mårtensson & Roxå 2016).

As informal change agent activities are grounded in shared needs, strategies and values of local communities of practice, they may be incongruent with formal organisational development processes and complicate the work of institutionalised developers and academic leaders (see also Pielstick 2000). On the other hand, the success of institutionalised development processes is dependent on the subsequent reactions and interpretations within the local socio-cultural contexts of their application (Knight & Trowler 2000). Change agents can utilise their position as informal pedagogical opinion leaders to affect the way that university-level development initiatives are reacted upon and interpreted among their colleagues in local discipline-specific communities. Consequently, informal change agency could play a central role in supporting the community-level implementation of university-level development strategies in organisational transformations.

1.3.2 Change agency as brokering at the interfaces of communities of practice

By acting as change agents, academics mediate at the interfaces of pedagogical and discipline-specific communities of practice. Previous research has referred

to promoting development by mediating across community borders as ‘knot-working’ (Engeström 2000), knowledge brokering (Meyer 2010), boundary crossing (Akkerman & Bakker 2011), and acting as a knowledge catalyst (Hannah & Lester 2009). This dissertation applies the conception of *brokering* introduced by Wenger (1998, 2000) to explore pedagogical development in communities of practice. Even though all academics mediate between various academic communities of practice by, for example, attending in-service training while working as a part of a discipline-specific research group, change agents apply brokering to actively seek ways to create connections and promote interaction at the community boundaries (see also Wenger 2000). As suggested by Annala and Mäkinen (2016) in relation to curriculum reforms, this kind of brokering is required for a successful implementation of organisation-wide transformations.

Brokering at the interfaces of pedagogical and discipline-specific communities of practice transforms shared system of meanings, identities, practices, and ways of belonging to a community through transformative learning. Brokers introduce new pedagogical elements into the shared system by applying practices of participation and reification. The two practices, referred to as techniques by Wenger (2000), are intertwined, and their interplay provides a basis for learning in communities of practice. Practices of participation, such as sharing information in an informal coffee break discussion, are based on dialogue between legitimate community members (see Wenger 1998). Practices of reification are based on creating boundary objects, such as artefacts, discourses, and processes, that embody meaning for both pedagogical and discipline-specific communities and are transferrable between them (see also Akkerman & Bakker 2011). For example, producing a guidebook of engineering education methodologies could be considered as a practice of reification that bridges the gap between pedagogical and engineering-specific communities of practice. In addition, brokering may involve creating boundary practices, including platforms, activities, and projects, that are shared between communities of practice (Wenger 2000). Both boundary objects, such as scholarly articles on discipline-specific teaching, and boundary practices, such as discipline-specific teaching seminars, facilitate interaction across community borders.

Applying brokering to promote pedagogical development in academic communities poses a challenge for academics without an institutionalised leadership or developer status. Identifying themselves as members of a discipline-specific community of practice, academics are accountable to its regime of competence and vulnerable to its power plays. The work of academics is guided by the disciplinary norms and traditions that define, explicitly or implicitly, what are considered as appropriate approaches to teaching (Mårtensson & Roxå 2016). Acting as brokers, academics can utilise their pedagogical community membership to bring new pedagogical perspectives to bear on the existing disciplinary teaching practices. The development activities related to brokering often require di-

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verting a substantial amount of time away from advancing the disciplinary responsibilities related to teaching and research. Consequently, a focus on pedagogical development activities can hinder academics' chances of tenure and promotion (Felder, Stice, & Rugarcia 2000).

The resulting theoretical framework of pedagogical development in academic communities of practice is presented in Figure 1. The Figure illustrates how the practices of brokering transform shared meanings, identities, practices, and ways of belonging to a community by creating opportunities for cognitively, socially, practically, emotionally, and contextually meaningful transformative learning experiences.

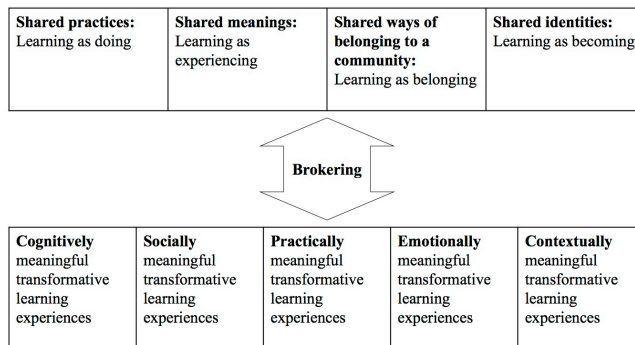


Figure 1. Framework of pedagogical development in academic communities of practice (based on Wenger 2000, Mezirow 2009)

1.4 Features of pedagogical development in engineering education

This dissertation is situated in the field of engineering education where, as in many other academic fields, transformations towards a more student-centred pedagogical approach are increasingly called for at an administrative level (Adams & Felder 2008; Henderson, Finkelstein, & Beach 2010). The need for pedagogical development is often highlighted in a context of organisational transformations where established courses and study programmes are threatened by, for example, declining recruitment (see also Warhurst 2008). In Finland, as in many other countries worldwide, the global phenomenon of growing competition for funding has intensified the demand to upgrade the quality of university teaching (Ylijoki & Ursin 2013). As a response, a CDIO approach to curriculum design was established in 2000 to create a new vision and a concept for undergraduate engineering education (Crawley et al. 2011). The university level approach holds that a cycle of conceiving, designing, implementing, and operating should provide a context for specifying a desired set of knowledge, skills and attitudes in

engineering education (Crawley et al. 2008) and implementing them in the teaching of local discipline-specific communities.

The challenge of student-centred pedagogical approaches, including the CDIO model (see Crawley et al. 2011), has been their implementation in practice. In a study by Borrego, Froyd, and Hall (2010), 197 US engineering department chairs were surveyed regarding their awareness and department use of seven engineering education innovations, namely student-activating pedagogies, engineering learning communities and integrated curricula, artifact dissection, summer bridge programmes, design projects in first-year engineering courses, curriculum-based engineering service-learning projects, and interdisciplinary capstone design projects. The findings showed that even though engineering educators are aware of these innovations, their adoption rate has remained low (Borrego, Froyd, & Hall 2010) and the predominant educational model still resembles the teacher-oriented, lecture-based model practised in the 1960s (Elshorbagy & Schönwetter 2002).

The low adoption rate of student-centred teaching methods and pedagogical innovations in engineering education has been explained by the mismatch between the technical sciences and the student-centred methods developed in the fields of education (Winberg 2008). As noted by Winberg (2008), technically oriented academics tend to consider teaching as straightforward transfer of knowledge from a disciplinary expert to the students, whereas in the field of education, teaching is understood as facilitating the knowledge construction process of the students. Academics in research-intensive universities are also affected by career advancement possibilities that often revolve around research-based merits, such as the number of scientific publications (Borrego, Froyd, & Hall 2010). In these universities, most academics value research over teaching and identify themselves as researchers rather than teachers (Felder, Stice & Ruggarcia 2000). As engineering educators have a great deal of autonomy in deciding how to teach their subject (Adams & Felder 2008), they might consider teacher development as irrelevant (Elshorbagy & Schönwetter 2002).

While the pressure to develop the quality of teaching has increased the number of pedagogical development courses offered in technical universities (Ylijoki & Ursin 2013), the ability of these courses to modify the local discipline-specific teaching practices has been widely questioned (Adams & Felder 2008). In order to supplement the effects of pedagogical development courses, previous studies have called for more collegial, locally grounded ways of supporting the application of new teaching methods (Borrego, Froyd, & Hall 2010). For example, in their study on how to enhance design-thinking skills among engineering students, Dym et al. (2005) emphasise the importance of increasing the number of academics interested in and capable of teaching according to the new methodologies in their local disciplinary communities. These pedagogically educated engineering educators could assume the role of 'teaching leaders' by supporting

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the application of new teaching methods in their local disciplinary communities (Adams & Felder 2008; see also Borrego, Froyd, & Hall 2010). Based on an interdisciplinary literature review of 103 articles in faculty development, STEM education research, and studies of higher education, Henderson, Finkelstein, and Beach (2010) concluded that educational reforms in the fields of science, technology, engineering, and mathematics need to put more emphasis on faculty involvement in the change process, as well as on the environments and structures within which the academics work.

In addition to the field of engineering education, increasing pressure towards improving the quality of teaching, and the challenges of developing discipline-specific teaching traditions are characteristic of many other academic fields (see e.g. Doring 2002; Ginns, Kitay, & Prosser 2010). Despite being situated in engineering disciplines, this dissertation aims to identify opportunities and challenges confronting academics when it comes to increasing the adoption rate of student-centred teaching methods that may be applicable across research-intensive higher education contexts.

2 Research questions

The findings of previous studies imply that both experiences of developing as a teacher (e.g. Åkerlind 2005) and acting as a pedagogical change agent (e.g. Doring 2002) are situated in two kinds of academic communities: pedagogically oriented, such as pedagogical development courses, and discipline-specific, such as departments and research groups. The effects of pedagogical development efforts in each community are interdependent (see also Gibbs 2013) but empirical research that identifies the nature of pedagogical development processes at the interfaces of these two communities remains scarce. This dissertation investigates academics' experiences of pedagogical development resulting from their activities at the interfaces of pedagogical and discipline-specific communities of practice.

To this end, the aims of the dissertation are twofold. First, it sets out to develop a theoretical and empirical model that situates academics' individual and collaborative processes of pedagogical development at the interfaces of pedagogical and discipline-specific communities of practice. Secondly, the dissertation endeavours to shed light on academics' activities at the interfaces of pedagogical and discipline-specific communities of practice as a source of pedagogical development in a context of organisational transformations. In order to achieve these aims, the following research questions will be addressed:

1. How can academics' activities and experiences at the interfaces of pedagogical and discipline-specific communities of practice contribute to the processes of developing as a teacher? (Studies I and II)
2. How can academics' activities and experiences as change agents at the interfaces of pedagogical and discipline-specific communities of practice contribute to pedagogical development in a context of organisational transformation? (Studies III and IV)

The research questions are addressed in one Finnish and three internationally published double blind peer reviewed articles (referred to as Studies I–IV) as follows:

Studies I and II address research question 1. Study I examines teacher development as a transformative learning process at the interfaces of pedagogical development courses and discipline-specific communities of practice. Study II widens the perspective by examining what kind of transformative learning experiences trigger teacher development at the interfaces of pedagogical and discipline-specific communities of practice.

Studies III and IV address research question 2. Study III examines what kind of pedagogical development experiences are related to acting as a change agent at the interfaces of pedagogical and discipline-specific communities of

Academics' transformative learning at the interfaces of pedagogical and discipline-specific communities practice before and during an organisational transformation. Study IV widens the perspective by identifying a wide variety of change agent activities over a three-year period of organisational transformation.

3 Context of the empirical studies

The four empirical studies that make up this dissertation are situated in the context of two Finnish higher education development programmes: a pedagogical development programme and a pedagogical change agent programme. The *pedagogical development programme* was organised in one of the leading public research universities in Finland in the fields of science and technology. Even though the technical university did not require any pedagogical training or previous teaching experience from its teaching faculty, its over 3,000 faculty and staff members were offered a uniform set of voluntary pedagogical development courses that formed a programme of 20 ECTS (European Credit Transfer and Accumulation System, one credit equaling approximately 27 hours of study). Even though participation in the programme was voluntary, every department was expected to send four new academics to the programme every year. The programme took in a total of 20 to 25 participants every six months. While the programme differed in structure, educators, and content during its existence between 1999 and 2009, the principles of communality, student-orientation, and practicality were consistent during these years. Organised by a centralised pedagogical development unit, the programme was aimed at deepening the participants' own pedagogical thinking and teaching skills as well as building a network of teachers across the departments.

The *pedagogical change agent programme* was established shortly after the technical university was merged into a larger multidisciplinary university at the beginning of 2010. The technical university came to constitute the majority of the schools in the newly merged university. Even though the development strategy of the newly merged university relied heavily on grassroots-level activeness and empowerment of its faculty, concrete ways of contributing to the development processes had not yet been identified in practice. In 2011, the faculty of the newly merged university began to prepare for degree programme reforms conducted in all schools in 2012. As a part of the reforms, the schools were developing their educational practices, and most of the over 5,000 faculty and staff members were involved in the pedagogical development processes at the department, programme, or course level. In 2013, the degree reform processes resulted in new courses being made available for the students. However, the development of the degree programmes continued in all schools.

In order to support the academics in the organisational transformation that occurred during the university merger and the large-scale curricular change, a one-year *pedagogical change agent programme* of 10 ECTS was organised by the university a year into the merger. In contrast to the *pedagogical development programme* that focused mainly on individual teaching skills, the new pro-

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programme was targeted at academics that had already completed a number of pedagogical development courses and were interested in developing the quality of teaching at the university level. The programme was aimed at providing the academics with a platform for sharing their development experiences in a supportive atmosphere. The topics revolved around the organisational transformation process and varied according to the interests of the participants, who were encouraged to take a proactive role in organising activities for the programme, with some of them deciding to attend educational conferences together, for example. Participation in the programme was voluntary and did not entitle the participants to an institutionalised developer status within the organisation.

4 Methodology

4.1 Methodological choices

The current study applied a *qualitative research approach* in exploring the nature of academics' processes of pedagogical development situated at the interfaces of pedagogical and disciplinary communities of practice. Qualitative approach was applied to provide an in-depth understanding of the ways in which academics experience the processes of pedagogical development over a period of time and to identify academics' interpretations of organisational factors that contribute to such experiences. Academics' experiences were approached as instances of a wider social phenomenon related to pedagogical transformation in higher education (see also Hatch & Wisniewski 1995). It is characteristic of qualitative research that samples are small and that the collected data are detailed, information-rich, and extensive (see also Elo & Kyngäs 2008). These kinds of data provide a fruitful basis for exploring new phenomena and building theory about emerging constructs and their relationships (Vaismoradi, Turunen, & Bondas 2013), especially in educational sciences (Cohen, Manion, & Morrison 2013).

The qualitative approach of the dissertation was applied within a *constructivist paradigm* that entails ontological, epistemological, and methodological assumptions regarding the qualitative research process (Guba & Lincoln 1994). Instead of adhering to a realist ontology that explores reality as an objective, external entity that is independent of the research participants and governed by universal laws (see Cohen, Manion, & Morrison 2013), the dissertation leaned towards more relativist assumptions of reality as socially constructed, interpretive, and situational (Creswell & Miller 2000). The chosen relativist ontology stresses the importance of participants' subjective experience in creating the social reality within which their processes of pedagogical development are situated. The focus was on identifying the perceptions that guide the participants' behaviour within the given socio-cultural context and modify the social constructions that are their reality (Cohen, Manion, & Morrison 2013).

The relativist ontological assumptions of the dissertation resulted in a subjectivist epistemology, in which the analysis entailed an interpretation of how the participants in the given socio-cultural context construct the world around them. The starting point of analysis was the participants' own interpretation of their pedagogical development activities and the organisational factors that had affected the resulting development experiences. The process of analysis was iterative and based on a combination of deductive and inductive reasoning (see also Cohen, Manion, & Morrison 2013). Deductive reasoning was applied to test the chosen theoretical framework in a context of the qualitative data collected for

this dissertation. Inductive reasoning was applied to enable the emergence of new categories to supplement the chosen theoretical framework in a context of this dissertation. The combined inductive-deductive approach was based on the researcher's interpretation of the participants' perceptions and resulted in a new construction of their reality.

The qualitative approach and the constructivist paradigm of the dissertation shaped the selection of research procedures, including the procedures for recruiting the participants as well as the methods of data collection and analysis.

4.2 Participants

The 23 participants in the four empirical studies comprising this dissertation were academics from a Finnish technical university that was merged into a larger multidisciplinary university in 2010. In Studies I and II, the participants were 10 engineering educators that had attended a *pedagogical development programme* offered by the technical university in different academic years between 1999 and 2007. For nine of the participants, participation in the development programme was their first pedagogical training experience. On average, the participants had attended the programme three years prior to the time of data collection. All of them had completed at least 10 ECTS of pedagogical development courses by the time of the study. The length of their teaching careers varied from seven to 20 years. The participants held teaching and research posts at the university, such as professors, university teachers, lecturers, and researchers. Their distribution was even across departments and gender.

The participants in Studies III and IV were 13 engineering educators that took part in a *pedagogical change agent programme* offered by the newly merged university. The participants had not taken part in Studies I and II. The change agent programme was targeted at academics that had already completed at least 25 ECTS of pedagogical development courses. Out of the 20 academics that had been accepted into the programme, the majority represented the field of engineering education. The participants in Studies III and IV all held teaching and research posts at the university, such as lecturers, researchers, or professors, and their experience in university-level teaching ranged from a few years to more than 20 years. Their distribution was even across the different schools of science and technology as well as regarding gender. The majority of the participants had an informal developer status at the time of the first data collection round, and this informal status changed for some of them over the course of the research period.

4.3 Data collection

Data collection for Studies I and II

Studies I and II were situated in the context of a pedagogical development programme organised by a Finnish technical university. The data were collected in 2009 by interviewing 10 engineering educators that had attended the pedagogical development programme of the technical university between 1999 and 2007. The participants were asked to describe their trajectories and past experiences related to becoming a teacher in a university.

Study I focused on the teacher development experiences resulting from participation in pedagogical development courses while working as a teacher and researcher in discipline-specific communities of practice. Study II built upon this perspective by exploring triggers for teacher development arising from participants' activities at the interfaces of pedagogical and discipline-specific communities of practice.

Data collection for Studies III and IV

Studies III and IV were situated in the context of a new pedagogical change agent programme after the technical university had merged into a larger multidisciplinary university in 2010. The data were collected in three separate phases in 2011, 2012, and 2013 by interviewing 13 engineering educators that attended the one-year pedagogical change agent programme in the newly merged university. The participants were asked to describe their trajectories and past experiences as informal educational developers.

Study III was based on the first round of data collection and examined what kind of pedagogical development activities and experiences were related to acting as a change agent before and during an organisational transformation by the year 2011. Study IV was longitudinal and based on all three rounds of data collection. The longitudinal study examined what kind of pedagogical development activities and experiences were related to acting as a change agent before and during a three-year period of organisational transformation in 2011–2013. Study IV also identified organisational factors that either enabled or prevented the development efforts.

Methods of data collection

The data for Studies I–IV were collected with *interviews* typical of the qualitative research approach (see e.g. Sandelowski 2000). The interview technique was open and the participants were allowed to talk freely about the personally meaningful experiences that would have been difficult to discover by asking about them directly (Wengraf 2001). In Studies I and II, the open interview technique resulted in extensive storytelling related to personal development as a teacher. As the participants were active in suggesting topics to talk about in a context of the interviews and sharing their development trajectories without the

researcher having to interfere the storytelling with semi-structured follow-up questions, the interviews were *narrative* in nature (see e.g. Connelly & Clandinin 1990). In Studies III and IV, the topic of the interviews shifted from personal pedagogical development to experiences of acting as a pedagogical change agent. In the context of a new interview topic and a new group of participants, the open interview technique, also applied in Studies I and II, did no longer result in narrative storytelling. Instead, the open interview technique resulted in concise descriptions of pedagogical development activities, and the researcher had to put more emphasis on semi-structured follow-up questions to encourage further descriptions of the participants' experiences. In Studies III and IV, the interviews were *thematic* rather than narrative.

Before the interviews, the participants were given a trigger exercise that involved *drawing a lifeline* (see e.g. Cermák 2004), which illustrated their development experiences. The exercise provided them with the opportunity to reflect on their past experiences in the context of the interviews. The participants were given time to determine the form and shape of the lifeline and to mark down all important and meaningful events, experiences or achievements related to the given topic. The lifelines consisted of retrospective interpretations of the meaningful experiences that had led the participants to the moment of the interviews (Dominicé 1990; Hatch & Wisniewski 1995). In Studies III and IV, the majority of the participants began to describe their trajectories right away.

When the interviews began, the participants were asked to describe their development trajectories and past experiences in chronological order, starting from the first critical incident marked on the lifeline (see also Flanagan 1954). The participants were allowed to describe all relevant aspects of their private lives and experiences in various professional communities during their careers. The researcher applied active listening, such as nodding and taking notes on what was said, to encourage the participants to describe their personally meaningful experiences of pedagogical development. The experiences were considered meaningful if they had generated a change in the participants' trajectory (Webster & Mertova 2007). Instead of interrupting the participants with questions, the researcher allowed free storytelling until the interviewees clearly indicated that the description had ended.

In the third phase of data collection, *semi-structured follow-up questions* were utilised to encourage the participants to reflect on their experiences further or to clarify the meaning of certain concepts or words, such as references to certain study programmes, institutions, or projects. The interviewees were also asked to specify any unclear parts of the description, such as which people were involved, where and when certain events had taken place, and why certain activities were initiated. The focus was on critical events that were experienced as personally meaningful (see Riessman 2008). Finally, at the end of the interviews, the interviewees were asked more *direct questions* related to the pedagog-

ical development programme (Studies I and II) or the change agent programme (Studies III and IV) that all participants had attended. The data collection is summarised in Table 1.

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Table 1. Data collection

Research question	Year	Data collection	Data	Study
1. How can academics' activities and experiences at the interfaces of pedagogical and discipline-specific communities of practice contribute to the processes of developing as a teacher?	2009	Narrative interviews with 10 engineering educators that had attended a pedagogical development programme in a technical university between 1999 and 2007.	10 interviews of approximately one hour each. 16 hours of recorded data related to developing as a teacher.	Study I on teacher development experiences of academics that had attended pedagogical development courses while working in discipline-specific communities of practice.
				Study II on triggers of teacher development arising from academics' activities at the interfaces of pedagogical and discipline-specific communities of practice.
2. How can academics' activities and experiences as change agents at the interfaces of pedagogical and discipline-specific communities of practice contribute to pedagogical development in a context of organisational transformation?	2011 2012 2013	Thematic interviews and follow-up interviews with 13 engineering educators that had attended a one-year pedagogical change agent programme in a newly merged university.	39 interviews of approximately one and a half hours each. 78 hours of recorded data related to acting as a change agent.	Study III on change agent activities and experiences before and during a period of organisational transformation based on the interviews conducted in 2011.
				Longitudinal Study IV on change agent activities and experiences as well as the influential organisational factors before and during a three-year period of organisational transformation.

4.4 Data analysis

The interview data were recorded and transcribed. The transcriptions contained general reflection related to the themes addressed in the interviews and episodic descriptions with clear beginnings, storylines, and endings. The episodic descriptions of personally experienced meaningful incidents were defined as units of analysis and all general explanations and theoretical reflections were excluded from the analysis. The data resulting from Studies I–IV were analysed with *qualitative content analysis* (see e.g. Sandelowski 2000; Graneheim & Lundman 2004; Vaismoradi, Turunen, & Bondas 2013). Both deductive and inductive forms of content analysis (e.g. White & Marsh 2006) were applied to summarise the informational content of the episodic descriptions and to categorise them according to thematic similarity (see also Polkinghorne 1995). In Studies I and II, the episodic descriptions were constructed as core narratives (see e.g. Connelly & Clandinin 1990) of developing as a teacher before qualitative content analysis of the descriptions.

Study I

In Study I, a total of 73 episodic descriptions were identified from the interview data. The descriptions covered experiences that had led to participation in the main pedagogical training programme offered by the technical university, took place during the training, and that resulted from the participation. These episodic descriptions were analysed deductively by applying the emotional, practical, social, cognitive, and contextual dimensions of *transformative learning* (see Mezirow 1991). The emotionally, practically, socially, and contextually meaningful experiences were classified as strengthening either the previous pedagogical meanings adopted before participation in pedagogical training or new pedagogical meanings adopted from the training. All cognitively meaningful experiences served to strengthen new meanings and were classified as either evaluative or critically reflective.

After the deductive analysis, sub-categories were created inductively according to the thematic similarity of the units of analysis. The analysis resulted in 28 subcategories out of which 18 were related to strengthening new pedagogical meanings and 10 were related to strengthening previous pedagogical meanings. Eight of the subcategories were related to socially meaningful experiences, eight to practically meaningful experiences, five to cognitively meaningful experiences, five to emotionally meaningful experiences, and two to contextually meaningful experiences. Each subcategory included one to nine episodic descriptions from one to nine participants.

Study II

In Study II, a total of 107 meaningful teacher development events were identified from the data and analysed deductively by applying the emotional, practical, social, cognitive, and contextual dimensions of *transformative learning* (see Mezirow 1991). After deductively sorting data to main categories based on the transformational learning dimensions, sub-categories were created inductively according to the thematic similarity of the units of analysis. The analysis resulted in 19 subcategories out of which six were related to emotionally meaningful experiences, five to practically meaningful experiences, four to socially meaningful experiences, three to cognitively meaningful experiences, and one to contextually meaningful experiences. Each subcategory consisted of one to 14 episodic descriptions from one to all 10 participants.

Study III

In Study III, 48 episodic descriptions of pedagogical change agent experiences were identified from the data and analysed deductively by applying the four dimensions of *learning in communities of practice* (see Wenger 1998). The focus of the analysis was on episodic descriptions of developing teaching at a community, rather than an individual, level. The category *meaning* included descriptions of negotiation of meaning through processes of participation and reification. The category *practice* included descriptions of translation, coordination and alignment between perspectives as well as creating boundary practices. It also included descriptions of acting as a broker without any further definitions of its means or focus. The category *community* included descriptions of belonging to an academic community and contributing to its development. The category *identity* included reflections on the ways of being a change agent. The four dimensions covered all descriptions in the interview data.

After the deductive analysis of categorising the data according to their thematic similarity with Wenger's (1998) conceptualisation of learning in communities of practice, subcategories were formulated inductively based on the specific focus of development experiences within each of the four main categories. The analysis resulted in a total of 10 subcategories. The number of descriptions in each subcategory varied from six to 20.

Study IV

In Study IV, 113 episodic descriptions of pedagogical change agent experiences were identified in the data. Forty-eight of the reported efforts took place before 2011, 37 efforts in 2012, and 28 efforts in 2013. The efforts from each year of the study were analysed deductively by applying the dimensions of *learning in communities of practice* related to meanings, practices, identities, and ways of belonging (see Wenger 1998). The four dimensions covered all episodic descriptions in the data and each category included 18 to 40 descriptions from eight to 13 participants.

After the deductive analysis, subcategories were created inductively based on the specific focus of the development activities. The analysis resulted in 10 subcategories out of which three were related to developing the shared pedagogical practices, three to developing the ways of belonging to the academic communities, two to developing the shared pedagogical meanings, and two to developing the academic identities. The number of episodic descriptions in each subcategory varied from six to 34.

After the content analysis, the reported development experiences were classified as either successful or unsuccessful based on the outcomes from the perspective of the change agents. The effort was deemed successful if the transformation was completed or accepted and unsuccessful if it resulted in severe resistance or unjustified rejection within the discipline-specific community. The successful and unsuccessful change agent experiences were analysed in the context of organizational transformation processes that either facilitated or challenged the development activities.

4.5 Ethical considerations

As suggested by Creswell and Miller (2000), three separate viewpoints can be applied to evaluate qualitative inquiry, namely that of the researcher, the participants in the study, and the people external to the study, such as reviewers and readers. In this chapter, the viewpoints of the researcher and the participants are applied to discuss ethical considerations concerning my own role, the selection of research procedures, and the potential consequences of taking part in the study.

My own perspective as a researcher

As noted by Corbin and Strauss (2008), ensuring the quality of research calls for awareness of the researcher's own perspectives, role, clarity of purpose and sensitivity to the participants' perceptions. At the beginning of Studies I and II, I had no previous experience of the technical university or its pedagogical development programme and no previous acquaintance with the participants. The design of the studies was based on the assumption that attendance in a pedagogical development programme supports the participants' development as a teacher. In order to avoid imposing my preconceived assumptions on the data, an open, unstructured interview technique was applied to enable the participants to describe their experiences freely. However, due to the personal nature of transformative learning experiences, the participants could have felt intimidated about sharing all of them freely with an unfamiliar researcher.

By the end of Studies I and II, I was employed by the newly merged university and was working as a professional developer on an educational development project. The publication of critical views regarding the university may not have

been problematic, but as the continuation of my career advancement depended on the university, I could not rule out the possibility that the publication of such views would have an impact on my work situation. Hence, I decided to avoid research questions that would evaluate the university and its services and to focus instead on the nature of informal development processes manifested in it. The chosen focus provided a theoretically meaningful basis for the studies. In order to do justice to the challenging and exceptional organisational situation, namely the merger and the following degree reforms, the experiences of research participants were presented in the context of on-going institutional development processes.

At the time of Studies III and IV, the educational development project that I was working on provided a physical platform for the context of the studies, namely the pedagogical change agent programme. In spite of not being a part of the programme staff, I was familiar with the programme from its early planning stages and had a collegial position with its organisers. My assumption was that taking part in the change agent programme would lower the participants' threshold for promoting pedagogical development among their disciplinary colleagues. Previous knowledge of the programme and personal experiences of the organisational context were helpful in creating a plausible analysis of the data (see also Corbin & Strauss 2008). The knowledge was utilised to provide a meaningful description of the organisational events, locations, and actors referred to in the interviews.

In Studies III and IV, I was familiar with some of the participants before data collection. During the three years of data collection, I established a personal relationship with all participants and the nature of the interview discussions evolved from formal to informal. I aimed at demonstrating sensitivity and respect for the participants in capturing their perceptions (see Corbin & Strauss 2008) but in the case of conflicting perceptions or contradictory viewpoints, I withheld my views and tried to remain empathetic towards the participants' experiences. For example, some participants seemed to consider their possibilities to act as a change agent to be weaker than what I perceived them to be. In these cases, I tried to familiarise myself with the participant's situation by asking for more information. As the participants were investing their time in the interviews and sharing their personal experiences with me, the threshold for reporting results that could potentially present the participants in a negative light was high. In these situations, protecting the participants was my first priority.

Participant perspective

Participation in Studies I–IV was voluntary, no incentives were used, and the participants were repeatedly informed of their right to withdraw at any time. However, it is possible that some of the participants could have considered taking part in the interviews as their responsibility as employees of the organisation.

For some of them, the threshold for withdrawing from the study after the interviews could have been too high. The participants in longitudinal Study IV in particular could have felt obliged to continue the interview process after the first data collection round. This possibility cannot be ruled out despite my efforts to ensure pressure-free participation. The participants were also informed about the use that the interview data would be put to and were guaranteed anonymity throughout the research process. According to the guidelines on ethical review concerning non-medical research with human participants (Finnish Advisory Board on Research Integrity 2009), an ethics review was not required.

Ensuring anonymity throughout the research process was important, as the number of pedagogically educated academics in the technical and newly merged universities was limited. Candid expression of critical opinions regarding the organisation, superiors, and disciplinary colleagues could have had negative effects on the participants' career advancement. In contrast, as the participants could be regarded as 'clients' of in-service development programmes, expressing criticism towards them, their organisers, and the surrounding pedagogical community of practice was not likely to complicate their academic careers. Studies I–IV were conducted in a manner that protected the participants' identity. The participants were assigned pseudonyms even during the analysis and their specific background information was not disclosed in any part of the research process. Citations from the original data were selected so that the participants could not be identified and the findings were presented as categories drawn from the whole sample rather than as individual experiences.

The concern related to voicing critical opinions was especially relevant in Studies III and IV, as the university was undergoing an organisational transformation and continuation of employment was uncertain. Being identified with criticism towards the employer may also have had an adverse effect on the participants' internal mandate and opportunities for continuing to act as informal change agents among their disciplinary colleagues and superiors. Consequently, some of the participants were hesitant to share critical opinions and negative experiences related to the organisation. It is possible that some were concerned about my role as an employee of the same organisation. However, the majority of the participants in Studies III and IV seemed to approach the interviews as an opportunity to express their feelings about the organisational situation and to open up about their fears and hopes regarding the reform processes.

4.6 Trustworthiness of the research process

In this section, the trustworthiness of the research process is evaluated from the perspective of transactional validity (see Cho & Trent 2006) in relation to the research procedures that were used to generate the findings. The evaluation is carried out from two viewpoints: that of the participant and that of the reviewer.

Participant perspective

In line with the constructive paradigm of the study, checking how accurately the researcher's interpretations represent the participants' perceptions and are faithful to their accounts was a critical part of the research process (Creswell & Miller 2000; see also Cho & Trent 2006). In Studies I and II, the participants were given a chance to comment on and ask for changes in the researcher's interpretation of their trajectories, thus validating the interpretation and minimising the risk of the researcher-constructed episodic descriptions taking on a life of their own and becoming dissociated from the participants' accounts (see Polkinghorne 1995). The participants requested no significant changes to the descriptions. In Studies III and IV, the researcher's interpretations of the first round of interviews were investigated and verified in the following two rounds of longitudinal data collection. The interpretations made in Studies I–IV were also contrasted with the researcher's interview notes and the participants' lifeline drawings.

Even though the findings aim at preserving the voices of the participants and were directly drawn from the original interview data, they are inevitably reduced and selective. In addition to the deductive creation of the main categories, inductive content analysis was applied to enable creating new sub-categories that demonstrate the variety and complexity of participants' experiences in the data (see Corbin & Strauss 2008). In all four studies, the resulting categories covered all episodic descriptions and were enriched with citations from the original data, thus increasing the credibility of the analysis (see Graneheim & Lundman 2004). The anonymity of the data and confidentiality of the research process may have encouraged the participants to freely express their experiences within the organisation.

Reviewer perspective

A second perspective to the trustworthiness of the research process is the credibility of an account from the viewpoint of individuals external to the study, such as readers and reviewers (Creswell & Miller 2000). In this chapter, trustworthiness is explored from the perspective of an external reviewer, for example a reviewer of a scientific journal in the field of higher education.

The research process was made as transparent and replicable as possible by demonstrating links between the research questions and the methods of data collection and analysis as well as the researcher's interpretations and the original interview data (see Anfara, Brown, & Mangione 2002). Providing a description of the decisions that were made in the research process allows the reviewer to evaluate how consistent the judgments about similarities and differences in the interview data were during the time of the analysis (Graneheim & Lundman 2004) and whether or not the resulting interpretations are credible (Anfara, Brown, & Mangione 2002). Even though providing a rich description of the context of the study would shed light on the situational, historical, and socio-

cultural factors that led up to the reported experiences and perceptions (see Corbin & Strauss 2008), such a description was not provided due to the need to protect the identities of the research participants.

As the researcher was working in the merged university and had pedagogical development responsibilities related to the research topic, external coders were used in addition to the researcher's own analysis to avoid imposing the researcher's preconceived assumptions on the data, and to increase the credibility of the analysis. In Studies I and II, an independent reviewer coded two of the ten interviews. Inter-rater agreement was calculated using Cohen's Kappa ($k=.92$), and was deemed to be sufficient. The results of the re-coding indicated that the interpretations made of the data were systematic and that the categorisation decisions were reasonable. In Study III, the robustness of the coding schemes was assured by having an independent reviewer re-code three of the 13 interviews, resulting in 95% agreement with the researcher. In Study IV, two independent reviewers coded a total of 12 of the entire data set of 39 interviews. All reviewers then discussed discrepancies in the analysis until they reached an agreement. The double-blind peer review process of scientific journals provided an external evaluation of the credibility of the account. However, it is possible that other researchers would have come up with alternative interpretations of the participants' perceptions (Guba & Lincoln 1994).

5 Results

The empirical part of this dissertation comprised four original papers (Studies I–IV) published or submitted for publication in peer-reviewed journals. These studies explore what kind of pedagogical development experiences are related to academics' activities at the interfaces of pedagogical and discipline-specific communities of practice. The results reveal the nature of two complementary processes of pedagogical development: *developing as a teacher* and *acting as a change agent*.

5.1 Developing as a teacher at the interfaces of academic communities

The first research question pertained to *how can academics' activities and experiences at the interfaces of pedagogical and discipline-specific communities of practice contribute to the processes of developing as a teacher*. Study I focused on the role of pedagogical development courses in academics' experiences of developing as a teacher. Study II widened this perspective by investigating the variety of meaningful development experiences beyond pedagogical development courses arising from academics' activities at the interfaces of pedagogical and discipline-specific communities of practice. The findings of both studies revealed transformative learning experiences that comprise critical reflection on disciplinary teaching traditions, exposure to new pedagogical conceptions in pedagogical development courses, and building commitment to new teaching methods within the discipline-specific community of practice. The studies also identified experiences of developing one's own pedagogical practices, developing a dual teacher-researcher identity, and gaining social support for the transformative learning process. The reported experiences constitute transformative learning processes related to developing as a teacher. The processes resulted in either (1) *establishing new pedagogical practices within the discipline-specific community* or (2) *preserving discipline-specific teaching traditions*.

For some academics, the process of developing as a teacher resulted in establishing new pedagogical practices within the discipline-specific community. The practices were based on critical reflection that was targeted towards the discipline-specific teaching traditions and often resulted in modifying the traditions by, for example, enriching them with new student-centred teaching methods. The majority of the academics that described establishing new pedagogical practices had become aware of the need to develop as a teacher before attending pedagogical development courses. This awareness resulted from a conceptual confrontation that triggered critical reflection on the discipline-specific teaching

traditions. These academics attended pedagogical development courses to find pedagogical ideas and social relations supportive of their critical reflection. After the development courses, the academics experimented with new teaching methods in practice and observed the resulting reactions of their students. If the experimentations resulted in improved learning outcomes or positive student feedback, the new pedagogical practices were sustained regardless of negative feedback from disciplinary colleagues and superiors.

For other participants of Studies I and II, the process of developing as a teacher resulted in preserving discipline-specific teaching traditions without imposing any critical reflection on them. These academics attended pedagogical development courses due to their own curiosity or a request from a superior. During the courses, the academics were exposed to new pedagogical ideas and social relations that triggered awareness of their disciplinary teaching traditions and personal approaches to teaching. Some of the participants considered the new pedagogical ideas incompatible with their experiences of teaching even during the development courses and reported reaffirmed commitment to the discipline-specific pedagogical traditions. However, the majority of the participants were interested in experimenting with new teaching methods after the development courses. In some cases, the threshold for implementing the new methods in practice was deemed too high and the development process resulted in preserving the disciplinary teaching traditions after the development courses.

Despite their suspicions, some academics reported becoming aware of the need to develop as a teacher during a pedagogical development course and started to experiment with new teaching methods after the course. If the experimentations received negative feedback from disciplinary superiors, colleagues, or students, these academics were likely to end the experimentations and return to their disciplinary teaching traditions. If the experimentations received positive feedback, the academics were likely to sustain the development efforts and start critically reflecting on their disciplinary teaching traditions. Likewise, for these academics, the process of developing as a teacher resulted in establishing new pedagogical practices within the discipline-specific community.

The processes of developing as a teacher by acting at the interfaces of pedagogical and discipline-specific communities of practice are presented in Figure 2.

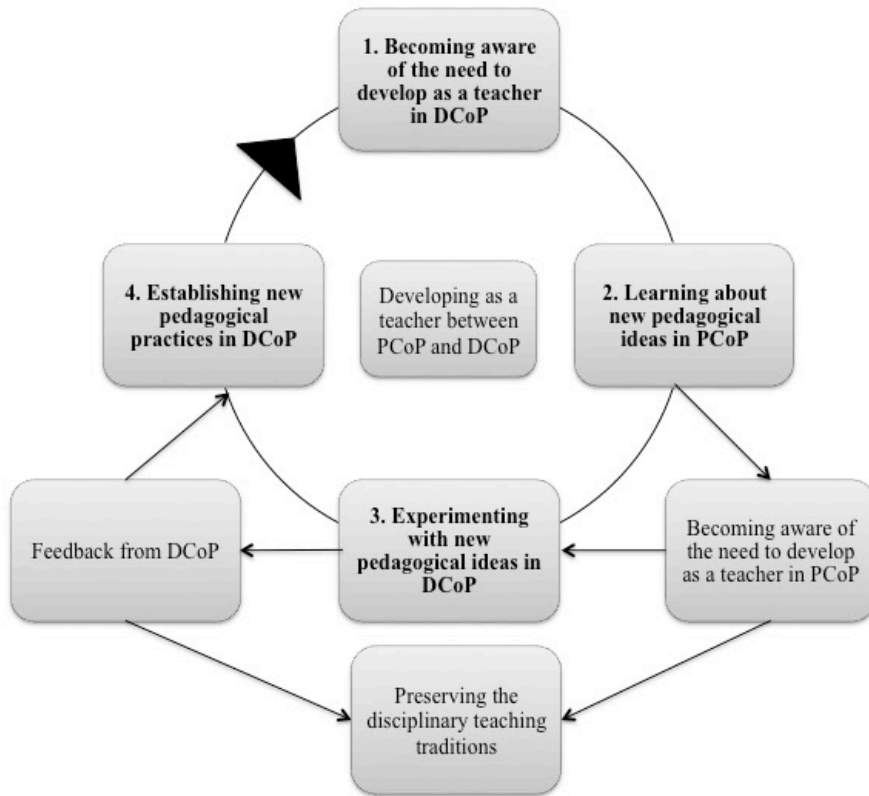


Figure 2. Developing as a teacher at the interfaces of pedagogical (PCoP) and discipline-specific (DCoP) communities of practice

5.1.1 Becoming aware of the need to develop as a teacher

The majority of the academics in Studies I and II became aware of the need to develop as a teacher some time after beginning their teaching careers within the university. The awareness resulted from facing difficulties in achieving intended pedagogical goals, having to work in a new teaching environment, or being exposed to contradicting pedagogical ideas. In the light of these challenges, the academics began to reflect on their pedagogical assumptions adopted from the discipline-specific community. If the assumptions were found to be incompatible with the new experiences, the academics became interested in identifying more effective ways of teaching. For some of the academics, critical reflection also resulted in disappointment towards the disciplinary role models of good teaching and alienation from the disciplinary community (Study II). In Figure 2, becoming aware of the need for pedagogical development is referred to as Stage 1 in the process of developing as a teacher.

In Figure 2, Stage 2 of developing as a teacher consists of learning about new pedagogical ideas by taking part in pedagogical development courses. Some of

the academics enrolled in the courses after becoming aware of the need to develop as a teacher. Being open to new ways of teaching already, the academics regarded the development courses as useful and supportive of their professional development (Studies I & II). For the academics who had felt alienation from their disciplinary community, the pedagogical community provided new social relations supportive of professional identities both as a researcher and as a teacher. Some of the academics reported identifying with the pedagogical developers who organised the training and attaching confrontational attributes to their disciplinary colleagues (Study I). One academic reported regret over not being able to identify herself as a teacher earlier during her teaching career. For her, participation in pedagogical development courses functioned as a triggering event for developing the pedagogical side of her work.

“The biggest thing for me actually was that I went to [the main pedagogical development programme offered by the university]. I think that was where, so late, I realised that this is how I want to teach. It changed my understanding of being a teacher, and I think it's a pity that I didn't have such an opportunity earlier on, as I would have had all of the prospects of being a good teacher then ... it's such a pity – I think that 'teacherhood' was born so late.” (Study II)

The majority of the academics in Studies I and II did not report experiencing a need to develop as a teacher before attending pedagogical development courses. In most cases, the academics attended the development courses due to their own curiosity, a request from their superior, or encouragement from their disciplinary community members. These academics reported having reservations towards the development courses and some of them ended up using defence strategies, such as joking about the new pedagogical ideas or attaching confrontational attributes to the organisers of the courses. This application of defence strategies resulted in preserving the disciplinary teaching traditions after the development courses.

The majority of the participants completed pedagogical development courses without critically reflecting on the pedagogical assumptions adopted from the discipline-specific community (Study I). However, they considered the development courses a valuable opportunity to establish new social relations across disciplinary communities. Despite the lack of critical reflection, the majority of the academics reported gaining pedagogical awareness, understanding a need for pedagogical development, and being motivated to experiment with new teaching practices (Study I). For these academics, participation in pedagogical development courses initiated a transformative learning process that continued after returning to the discipline-specific community of practice. These findings are in line with previous studies that have identified pedagogical development courses

as a source of university teachers' pedagogical awareness (Postareff, Lindblom-Ylänne, & Nevgi 2007; Stes, Coertjens & van Petegem 2010).

5.1.2 Establishing new pedagogical practices in discipline-specific communities

Building commitment to new pedagogical ideas presented in pedagogical development courses required opportunities for experimenting with them in practice within the discipline-specific community. Even though the majority of the academics had recognised a need to develop as a teacher before or during the development courses, only some of them proceeded to experiment with student-centred teaching methods on their courses (Studies I and II). For the others, the threshold for experimentation was deemed too high or the opportunities for experimentation were lacking in the disciplinary community. In Figure 1, experimenting with new pedagogical ideas in practice represents Stage 3 of the process of developing as a teacher.

As the reported teaching experimentations differed from the disciplinary teaching traditions, the academics were concerned about the possibility of losing social acceptance among their disciplinary colleagues. If the community was very homogeneous, the academics were tempted to readopt the shared disciplinary traditions and passive attitudes towards pedagogical development. However, having even just one supportive disciplinary colleague inspired and sustained the development efforts (Study IV). Moreover, the attitude of superiors and other disciplinary management affected the experienced risks involved in the development efforts; if the higher-ranking disciplinary community members highlighted the importance of research activities over teaching, the interviewed academics considered focusing on pedagogical development work as rebelling against the disciplinary community (Study III). Those academics that had recognised a need for pedagogical development before attending pedagogical development courses were most consistent in their development efforts regardless of the attitudes and feedback from their disciplinary colleagues and superiors (Study II). One of the academics even targeted the experimentations towards the disciplinary community by organising pedagogical collaboration between the other discipline-specific teachers (Study II).

The majority of the academics in Studies I and II described feeling uncertain about whether the new pedagogical ideas were superior to the disciplinary teaching traditions. As a means of evaluating the effects of the new teaching methods, they highlighted the importance of observing the reactions of their students. The academics that had recognised the need for pedagogical development before pedagogical development courses focused mainly on student learning, whereas the other academics focused mainly on student satisfaction. It is possible that the learning outcomes of new student-centred methods were more difficult to ob-

serve than the overall satisfaction of the students. Positive student feedback and improved learning outcomes built commitment to the new teaching methods. Successful experimentation also encouraged critical reflection on the shared pedagogical assumptions of the disciplinary community (see also Guskey 2002). In the following quotation, one of the academics describes how a teaching experimentation confirmed the ideas presented in pedagogical development courses.

“... it was very interesting in the sense that all the things that had been said in the pedagogical development course were realised during [the teaching experiment]. First of all, there was a lot of student resistance because they had never experienced anything like that before; they had to overcome that. It called for persuasion – you need to win them over. And then I noticed that some of them were delighted; they were mature enough, and it was easier to evaluate what and how they learn ...” (Study I)

As described in the above quotation, some of the students were not used to the student-centred teaching methods and would have preferred traditional lecturing rather than active discussion or group work (Studies I & II). The academics that had become aware of the need for pedagogical development prior to pedagogical development courses continued the teaching experiments despite of negative student feedback. However, the more hesitant academics were discouraged from continuing to apply the new teaching methods after receiving negative student feedback. Without positive experiences of acting according to the new pedagogical ideas, these academics were drawn to preserve their disciplinary teaching traditions, which typically interrupted the transformative learning process. It is also possible that some of the new pedagogical ideas were not suitable for the disciplinary context of teaching and that the traditional disciplinary teaching methods resulted in better learning outcomes among the students. For some academics whose teaching experimentations were halted or interrupted, the development process continued later in their career, as they received more responsibility or freedom to develop their teaching (Study II).

Half of the reported teaching experiments were successful and gained positive feedback from the disciplinary community (Studies I & II). In these cases, the academics critically reflected on their disciplinary teaching traditions and, if deemed necessary, modified or replaced them with new pedagogical practices within the disciplinary community. In Figure 2, establishing new pedagogical practices represents Stage 4 of the process of developing as a teacher. The success of the teaching experiments as well as the subsequent attitudes and reactions of the discipline-specific community members also affected the experienced effects of pedagogical development courses. If the teaching experiments were perceived as unsuccessful, they resulted in more negative evaluations of

the pedagogical development courses, whereas the successfully completed experiments increased the experienced effectiveness of pedagogical training (Study I).

5.2 Promoting pedagogical development by acting as a change agent

The second research question pertained to *how can academics' activities and experiences as change agents at the interfaces of pedagogical and discipline-specific communities of practice contribute to pedagogical development in a context of organisational transformation*. Study III investigated the variety of pedagogical development experiences arising from academics' activities at the interfaces of pedagogical and discipline-specific communities of practice. Study IV furthered this perspective with a longitudinal approach to pedagogical development efforts as well as their organisational enablers and obstacles during a three-year period of organisational transformation. The findings of Studies III and IV revealed how simultaneous membership in both pedagogical and discipline-specific communities of practice enables the promotion of transformative learning amongst disciplinary colleagues.

Studies III and IV identified ways of exposing discipline-specific community members to new pedagogical meanings, practices, identities, and ways of belonging to the community over a period of organisational transformation. Exposure to any of the interconnected elements adopted from the pedagogical community of practice had the potential to trigger shared pedagogical development processes within the discipline-specific community. Each year of the study, the described change agent activities were adapted to the stage of the organisational transformation process and their success was dependent on the organisation's ability to support the efforts within the disciplinary communities. The change agent activities related to promoting pedagogical development by acting at the interfaces of pedagogical and discipline-specific communities of practice are presented in Figure 3.

Academics' transformative learning at the interfaces of pedagogical and discipline-specific communities

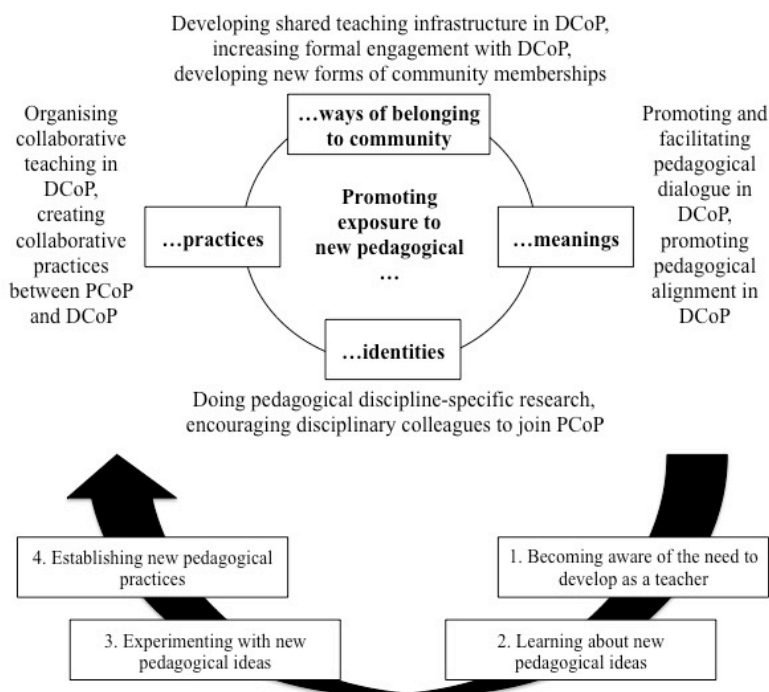


Figure 3. Acting as a change agent at the interfaces of pedagogical (PCoP) and discipline-specific (DCoP) communities of practice

5.2.1 Promoting exposure to new pedagogical practices

In the first year of the study, the majority of the interviewees' descriptions were related to change agent activities that focused on developing shared teaching practices together with or with the support of disciplinary colleagues (Study IV). The development initiatives included *organising collaborative teaching* and *creating boundary practices* at the interfaces of the discipline-specific and pedagogical communities of practice.

Organising collaborative teaching

Despite of the individual, autonomous nature of teaching (see also Knight & Wilcox 1998) typical of engineering education in particular, having even just one like-minded, pedagogically active disciplinary colleague enabled the change agents to organise collaborative teaching activities in the disciplinary community (Study IV). These collaborative activities, such as pedagogical workshops or joint lectures, provided an opportunity for the disciplinary community members to experiment with new teaching methods and to challenge shared discipline-specific teaching traditions. The change agents could utilise their own courses as collaborative development platforms without consulting other disciplinary colleagues or asking their superiors or the department management for permission.

By the same token, the autonomy to make independent decisions on one's own teaching also allowed disciplinary colleagues and superiors to refrain from joining common development activities. The solitary nature of teaching also prevented finding information on potential collaboration partners within the community.

Creating collaborative practices between pedagogical and disciplinary communities

Widely accepted membership provided the change agents with the legitimacy to participate in the shared activities of both pedagogical and discipline-specific communities of practice (see also Remmik et al. 2011). Some of the change agents reported creating boundary practices as a way of encouraging idea sharing between their pedagogical and disciplinary colleagues (Studies III & IV). These practices included pedagogical workshops and seminars for researchers and were typically based on an occurring need to discuss certain pedagogical issues within the discipline-specific community. These issues concerned, for example, the quality of teaching in English within the mainly Finnish-speaking research community. Even though just one academic could initiate a collaborative event within the disciplinary community (Study III), the majority of the boundary practices were organised in collaboration with like-minded colleagues from both pedagogical and disciplinary communities (Study IV). Being based on disciplinary needs and initiated by disciplinary community members, boundary practices also had the potential to reach those academics that were not interested in enrolling in pedagogical development courses.

As legitimate members of the pedagogical community, change agents reported having access to resources such as teaching materials, professional developers, and university-level contact networks. However, they struggled to find legitimacy, time and funding for implementing new pedagogical practices within the discipline-specific community. The reported development activities were easily halted if the change agent or the collaborating disciplinary colleagues had to focus on increased research or teaching responsibilities. In some cases, the new pedagogical activities were overridden by university level decisions. In the following quotation, an academic describes how his collaborative teaching experiment was overridden by a university-level decision to replace all courses in the study programme with new ones.

“I started a teaching experiment [years] ago. ... Now the experiment will be shut down ... and there's one class of students who will not be able to finish the [...] programme. ... the experiences resulting from my experiment could not be used in developing the new courses.” (Study IV)

While the need to carry out significant curriculum reforms within universities may be widely accepted, it can be devastating for academics to feel that the years spent on development work to improve the quality of teaching have been in vain.

5.2.2 Promoting exposure to new ways of belonging to the community

The majority of the change agent activities related to developing shared ways of belonging to the discipline-specific community were reported during the first year of the longitudinal study (Study IV). The initiatives included *developing shared teaching infrastructure*, *increasing formal engagement with the disciplinary community*, and *developing new forms of community memberships*. The total number of these efforts decreased significantly during the degree reform process in the second and third year of the study.

Developing shared teaching infrastructure

The change agents described developing shared teaching infrastructure by developing more student-friendly spaces for studying and acquiring new teaching equipment, such as clickers for the lecture halls (Study IV). These developments took place particularly during the first year of the study, when the change agents were developing the shared disciplinary teaching practices and attending the university's pedagogical change agent programme. Modifying the disciplinary context of teaching supported the collaborative teaching experiments and provided an opportunity for all disciplinary community members to act differently with their students. However, these activities typically required access to funding and formal decision-making processes within the university.

Increasing formal engagement with the disciplinary community

During the organisational transformation and degree reform processes in the second year of the study, many academics had concerns about the continuation of their employment. In addition, the change agents described increasing formal engagement with the discipline-specific community by taking part in formal pedagogical meetings and applying for institutionalised pedagogical decision-making positions (Study IV). Acquiring access to the formal discussions could potentially increase the heterogeneity of perspectives involved in the institutionalised decision-making processes and trigger critical reflection related to the shared disciplinary teaching traditions. It could also lower the threshold for other pedagogically active disciplinary community members to join the formal meetings and raise issues related to the quality of teaching.

Developing new forms of community memberships

The number of change agent activities related to developing new forms of community memberships increased towards the end of the ongoing degree reform processes during the third year of the study (Study IV). It is possible that the uncertainty about future employment during the transformation process motivated the change agents to seek new forms of memberships in multiple communities. The change agents leveraged these memberships in developing new ways of belonging to their own discipline-specific community (Study IV). For example, one academic reported utilising her connections with the industry to establish a developer role that included collaboration with an outside expert in degree programme development. Another academic reported utilising her part-time employment in another discipline-specific community to acquire additional funding for working as a pedagogical developer. Once established, these new forms of community membership were available to all disciplinary colleagues. In the following quote, membership in a disciplinary community as an internal pedagogical developer is contrasted with the change agents' responsibility for creating connections to spread pedagogical changes across academic communities.

“There are a lot of people here that do a lot of development work, but they have narrowed it down. ... They develop their own courses or laboratory exercises or supervise their own thesis workers well. Change agency means that a person is willing to, and hopefully also skilful enough, to spread changes within the organisation.” (Study IV)

5.2.3 Promoting exposure to new academic identities

In some discipline-specific communities of practice, engagement in pedagogical development rather than research situated the academics in the margins of the community (Study III). During the first and second year of the study in particular, the change agents described efforts at including pedagogical development into the definition of disciplinary expertise (Study IV). These efforts included *conducting and presenting pedagogical research* as well as *encouraging disciplinary colleagues to join pedagogical development activities*. However, by the third year of the study, some of the change agents might have considered engagement in disciplinary rather than pedagogical research activities as necessary for retaining their employment during the uncertain transformation process. It is also possible that as pedagogical development responsibilities were included in most academic positions during the transformation process, the need for change agents to promote pedagogical development identities was diminished.

Conducting and presenting pedagogical discipline-specific research

One of the ways of strengthening the role of pedagogical development within the disciplinary community included *conducting and presenting pedagogical discipline-specific research* (Study IV). As the funding of discipline-specific communities is typically tied to the number of scientific publications, pedagogical discipline-specific research publications were utilised to communicate the value of pedagogical development as a part of academic expertise. In line with the findings of Brew (2002) among professional developers, presenting the pedagogical discipline-specific research findings could provide a mutual language between the pedagogical and disciplinary community members and function as research-based justification for further pedagogical development efforts. The number of these development efforts increased during the degree reform process in the second year of the study, when the university was calling for pedagogical solutions that would improve the quality of teaching and learning. In the following quotation, an academic describes pedagogical community meetings as a source of information and feedback on pedagogical, discipline-specific research.

“In the pedagogical meetings, I find out ... what the current focus areas and most critical issues are. I have also introduced my own pedagogical research findings and they [the attending academics] have been very interested.” (Study IV)

Encouraging disciplinary colleagues to join pedagogical development activities

In the first year of the study, some change agents described having encouraged their disciplinary colleagues to join the development activities of a pedagogical community of practice before the university was merged in 2010. They described mentoring novice academics, persuading colleagues to attend pedagogical development courses, showcasing exemplary teaching, sharing pedagogical materials, and giving advice on pedagogical development (Studies III & IV). By sharing their own experiences of successful and unsuccessful pedagogical experiments, the change agents could promote a safe atmosphere and permissive attitude towards conducting pedagogical experiments as a part of the regime of the discipline-specific community. However, the findings imply that by the second year of the study, the community members were too burdened with the degree reform process to join any other development efforts (Study IV).

5.2.4 Promoting exposure to new pedagogical meanings

At the beginning of the degree reform preparations by the second year of the study, the number of pedagogical development meetings increased in all schools. The change agents shifted their attention away from developing shared teaching

practices, community memberships, and identities to promoting exposure to new pedagogical meanings in disciplinary communities of practice. These efforts included *promoting and facilitating pedagogical dialogue* in disciplinary communities and *promoting pedagogical alignment* in disciplinary discussions.

Promoting and facilitating pedagogical dialogue

As the degree reform preparations consisted of meetings for the most part, change agents reported promoting pedagogical dialogue by taking part in disciplinary discussions and translating pedagogical information into discipline-specific jargon (Studies III & IV). Wenger (1998) refers to these activities as ‘techniques of participation’. As the change agents were simultaneously taking part in the degree reform discussions of the pedagogical community of practice, they were able to identify new ways of approaching the disciplinary reform processes and to share information on pedagogical solutions in other schools. Change agents also described asking critical questions related to the disciplinary teaching traditions and pointing out alternative solutions adopted from the pedagogical community of practice. In some cases, the outcomes of these community-level discussions were overridden by pedagogical decisions made by the university management (Study IV), decreasing the motivation of disciplinary community members to take part in further pedagogical discussions.

In addition to voicing their opinions in disciplinary discussions, change agents described promoting translation and coordination between various perspectives of other disciplinary community members (Studies III & IV). These activities were aimed at finding a common will and creating a shared pedagogical vision among the disciplinary community members. Instead of intimidating their disciplinary colleagues with pedagogical jargon or strong opinions, change agents reported almost “tricking” their disciplinary colleagues into widening their perspectives on teaching and learning (Study III). Even those change agents with an official decision-making status preferred a diplomatic approach. For example, one academic described enlisting like-minded, pedagogically active disciplinary colleagues in creating a convincing slogan to communicate a new pedagogical vision for the department.

“And pretty quickly we got this goal that, ... we want to be recognised for our teaching at a national level. “Now we start working!” And that was the message that we tried to deliver within our department. And we came up with a special slogan [related to the goal] that we began to repeat.” (Study III)

Promoting pedagogical alignment

As the majority of change agents lacked institutionalised decision-making status, their development efforts were mostly based on informal discussions and lacked continuity and designated resources within the organisation. However, some of

the change agents also reported promoting alignment with certain outcomes of discipline-specific pedagogical discussions (Studies III & IV). These activities, also referred to as 'techniques of reification' (see Wenger 1998), included preparing pedagogical development guides and proposals, establishing official development projects, and applying for official pedagogical recognition. The activities resulted in establishing new, institutionalised pedagogical practices in the discipline-specific community. The findings imply that even though the degree reform process slowed down informal change agent activities by the second year of the study, it did not seem to affect the frequency of formal development efforts based on an institutionalised decision-making position.

5.3 Summary of the key findings

How can academics' activities and experiences at the interfaces of pedagogical and discipline-specific communities of practice contribute to the processes of developing as a teacher? (Studies I and II)

In Studies I and II, the academics described successful processes of developing as a teacher that involved experiences of *becoming aware of the need for pedagogical development, learning about new pedagogical ideas, experimenting with new pedagogical ideas in practice, observing positive learning outcomes and receiving positive feedback* for the new pedagogical practices. These experiences were situated in both pedagogically oriented and discipline-specific communities of practice.

Becoming aware of the need for pedagogical development in a discipline-specific community of practice before attending pedagogical development courses enhanced the effects of the courses and resulted in sustained discipline-specific teaching experimentations. For some academics, taking part in pedagogical development courses without a personally experienced need to develop as a teacher increased the likelihood of preserving disciplinary teaching traditions and refraining from pedagogical community membership. For other academics, taking part in pedagogical development courses triggered awareness of the need to develop as a teacher and increased motivation to develop the disciplinary teaching traditions.

Establishing new teaching practices after pedagogical development courses called for opportunities to experiment with teaching ideas in practice without sacrificing the social acceptance of the discipline-specific community. For those academics that had become aware of the need for pedagogical development during pedagogical development courses, continuation of the teaching experimentations was dependent on the subsequent reactions of the discipline-specific community members. However, finding even one supportive disciplinary colleague sustained development efforts. The success of the discipline-specific teaching

experimentations influenced how the academics experienced the effects of pedagogical development courses. If the teaching experimentations were successful, the academics were likely to establish new pedagogical practices within the discipline-specific community of practice.

How can academics' activities and experiences as change agents at the interfaces of pedagogical and discipline-specific communities of practice contribute to pedagogical development in a context of organisational transformation? (Studies III and IV)

In Studies III and IV, the academics described successful efforts of acting as a change agent by exposing their disciplinary colleagues to new pedagogical meanings, practices, identities, and ways of belonging to the community. These activities were based on a simultaneous membership in both pedagogically oriented and discipline-specific communities of practice. The change agent activities aimed at creating connections between the two communities.

The academics described contributing to pedagogical development by *initiating and facilitating pedagogical dialogue* in discipline-specific communities of practice as well as *promoting alignment to decisions resulting from the dialogue*. They also described *creating collaborative practices* between pedagogical and discipline-specific communities of practice as well as *creating opportunities for collaborative teaching* within the disciplinary community. In addition, the academics described *doing pedagogical research, encouraging disciplinary colleagues to join the pedagogical community of practice, developing new forms of community memberships, developing shared teaching infrastructure, and increasing formal engagement with the discipline-specific community*.

Regardless of the informal nature of the change agent activities, their focus was adapted according to the formal organisational transformation processes. Before the period of organisational merger and degree reforms, the majority of the change agent activities were related to developing shared pedagogical practices and disciplinary teaching traditions. As the degree reform preparations consisted of meetings for the most part, the change agents shifted their focus away from developing the disciplinary teaching practices to facilitating pedagogical discussions related to the reform. The uncertain job security and the unclear decision-making policies related to the organisational transformation also encouraged the change agents to strengthen their own role in disciplinary communities of practice by, for example, applying for formal pedagogical decision-making positions.

6 Discussion

6.1 Reflections on the results

In this dissertation, a transformative learning perspective (see Mezirow 1991) provided a theoretical basis for identifying academics' activities and experiences of pedagogical development at the interfaces of two academic communities of practice: pedagogically oriented and discipline-specific communities. The results revealed the nature of two complementary processes of pedagogical development: *developing as a teacher* and *acting as a change agent*. Even though academics' activities and experiences of developing as a teacher and acting as a change agent were studied separately, the community-level approach revealed a connection between these two processes of pedagogical development. By establishing connections between pedagogical and discipline-specific communities of practice and developing shared discipline-specific teaching and learning activities, change agents increased the ability of disciplinary communities to trigger and support transformative learning among the community members. Such support is particularly important for novice academics, whose development as a teacher is mostly based on informal relationships with their disciplinary colleagues (Warhurst 2006; Remmik et al. 2011; Remmik 2013).

The emergence of change agency is likely to be higher in disciplinary communities that trigger and support transformative learning related to developing as a teacher. As change agency is based on collegial collaboration and negotiation (see also McGrath 2017), change agents benefit from having like-minded colleagues that share an interest in pedagogical development and are willing to engage in pedagogical experimentation. The results of this dissertation contributed to an understanding of why certain academic communities support pedagogical development better than others (see e.g. Remmik et al. 2011), and why the implementation of institutional pedagogical development strategies is more successful in some academic communities than others (Mårtensson & Roxå 2015; see also Annala & Mäkinen 2016). The results suggested that the effects of pedagogical development programmes should be regarded as an interplay between pedagogical and disciplinary communities of practice, rather than one-directional transfer from development programmes into participants' disciplinary course practices (see e.g. Ginns, Kitay, & Prosser 2010).

This dissertation resulted in two main conclusions that are discussed in the following subchapters:

- 1) Academics' processes of developing as a teacher are mediated by transformative learning experiences at the interfaces of pedagogical and discipline-specific communities of practice.

- 2) Informal change agency promotes alignment between processes of individual teacher development and organisational transformation at the interfaces of pedagogical and discipline-specific communities of practice.

6.1.1 Transformative learning experiences as mediators of teacher development

The first conclusion of this dissertation pertains to the ways in which academics' processes of developing as a teacher are mediated by transformative learning experiences at the interfaces of pedagogical and discipline-specific communities of practice. The results revealed that academics' activities at the interfaces of pedagogical and discipline-specific communities of practice resulted in transformative learning experiences that cumulatively affected their processes of developing as a teacher. These experiences, namely becoming aware of the need for pedagogical development, being exposed to new pedagogical ideas, and implementing new pedagogical ideas in practice, were identified both in pedagogically oriented and discipline-specific communities of practice. The findings suggested that the processes of developing as a teacher require simultaneous participation in both communities. The results also suggested that the lack of any of these experiences, such as lack of opportunities to experiment with new pedagogical ideas in disciplinary teaching, may halt the transformative learning process and result in preserving disciplinary teaching traditions rather than developing them. Building on previous studies on the cyclical nature of novice university teachers' pedagogical development (Remmik & Karm 2012) and the importance of local disciplinary communities in academics' pedagogical development (see e.g. Warhurst 2008; Remmik et al. 2011), this dissertation identified transformative learning experiences that cumulatively contribute to pedagogical development processes in the context of both pedagogical and disciplinary communities.

The results implied that academics need different kinds of pedagogical and discipline-specific support for pedagogical development depending on their current stage of transformative learning. For example, in the early stage of their development as a teacher, the academics were likely to focus on the satisfaction of and feedback from disciplinary colleagues, superiors, and students in relation to their teaching experiments (see also Guskey 2002). At this stage, the academics emphasised the importance of disciplinary collegial encouragement for sustained pedagogical development efforts (see also Warhurst 2008; Remmik & Karm 2012). Towards the later phases of cyclical transformative learning processes, the academics shifted their focus from feedback and satisfaction to students' learning outcomes resulting from experimenting with new teaching practices. At this stage, the academics relied mostly on their relations with the pedagogical community of practice and were likely to continue the development pro-

cess regardless of the reactions of their disciplinary colleagues and superiors. The results contribute to previous studies that have called for identifying appropriate pedagogical support for different forms of reflection related to academics' transformative learning (see e.g. Kreber 2006).

In the light of this dissertation, pedagogical communities of practice play a critical role in providing academics with both new pedagogical ideas for developing disciplinary teaching traditions and a socio-cultural context supportive of teacher development (see also Remmik et al. 2011). However, the results confirmed that awareness of good teaching resulting from participation in pedagogical development courses does not automatically result in implementation of new pedagogical practices in discipline-specific communities (see also Guskey 2002; Remmik & Karm 2012; Nevgi & Löfström 2015; McGrath 2017). In some cases, as also noted by Postareff et al. (2007), participation in pedagogical development courses may increase academics' awareness of challenges related to organising good teaching in their disciplinary communities, thus increasing frustration rather than development motivation. Instead of being open to new pedagogical ideas, some participants in this study were drawn to preserve their disciplinary teaching traditions during pedagogical development courses. It is possible that the new pedagogical ideas were perceived as incompatible with the disciplinary contexts of teaching and learning. It is also possible that due to the stage of their transformative learning processes, the resistant or frustrated academics would have benefitted more from disciplinary collegial support than pedagogical training. Hence, the results of this dissertation highlight the need to develop more context-specific and locally integrated forms of pedagogical support to bridge the gap between new pedagogical ideas and discipline-specific teaching traditions (see also Remmik et al. 2011; Remmik & Karm 2012).

The results revealed that becoming aware of the need for pedagogical development in local discipline-specific communities supports academics' transformative learning in pedagogical development courses. Even for those academics that were inclined to resist new pedagogical ideas in pedagogical development courses, simultaneous membership in a discipline-specific community of practice provided opportunities for transformative learning through, for example, experimentation with new teaching methods in practice. The nature of academics' transformative learning experiences in disciplinary communities of practice, particularly the success of teaching experiments and the subsequent reactions of disciplinary colleagues, also determined the perceived effects of pedagogical development courses (see also Ho 2000; Guskey 2002). Variation in academics' stages of transformative learning and experiences in local disciplinary communities may explain why some previous studies have reported more negative effects of pedagogical development courses than others (see also Mårtensson 2014). As the majority of these studies have been conducted right after pedagogical development courses, they have resulted in rather positive evaluations of their effects

(see e.g. Postareff et al. 2007). This dissertation revealed that learning in pedagogical development courses provides a basis for cumulative transformative learning experiences throughout one's academic career, rather than the development process being completed during the courses.

6.1.2 Change agency as a way of aligning individual and organisational processes of pedagogical development

The second conclusion of this dissertation pertains to the ways in which informal change agency promotes alignment between processes of individual teacher development and organisational transformation at the interfaces of pedagogical and discipline-specific communities of practice. The study identified a wide variety of activities that change agents can apply to promote processes of pedagogical development among their disciplinary colleagues in a context of organisational transformation. The majority of the activities, such as identifying teaching problems and turning them into development opportunities, have been previously identified in relation to successful, discipline-specific, institutionalised pedagogical leadership (see e.g. Gibbs, Knapper, & Piccinin 2008). Despite their lack of an institutionalised developer or leadership position, the change agents applied the informal development activities in accordance with the simultaneously ongoing organisational degree reform processes. While being grounded on the individual development needs in local communities, the change agent activities were triggered and guided by the organisational development objectives (see also Warhurst 2008). The resulting developments were based on local discipline-specific development strategies and related to shared pedagogical practices, meanings, identities, and ways of belonging to a community. Building on previous studies that have emphasised the importance of involving local academic communities in pedagogical development processes at an organisational level (see e.g. Warhurst 2006; Annala & Mäkinen 2016), this research identified change agency as a way of creating connections between community and organisational levels of development (see also Mc Grath 2017).

The results highlighted collegial dialogue as a way of affecting how teaching and learning activities are understood and organised in disciplinary communities. As also suggested in previous studies on academics' informal change agency (e.g. Doring 2002; McGrath 2017) and professional development (e.g. Mårtensson 2014), collegial dialogue is accessible to all legitimate community members regardless of their institutional position and provides an opportunity for connecting the ongoing processes of organisational transformation with disciplinary community members' processes of developing as a teacher. Having membership in both pedagogical and disciplinary communities of practice, change agents can identify which pedagogical solutions may be relevant to individual processes of pedagogical development in disciplinary communities of

practice. As also noted by Knight and Trowler (2000), all seemingly irrelevant pedagogical solutions are easily resisted and rejected in local negotiations that might be difficult to access for professional developers and academic leaders outside the community (see also Hannah & Lester 2009). In fact, the majority of change agent activities identified in this dissertation, such as creating boundary practices and publishing research articles on discipline-specific teaching, were aimed at promoting dialogue at the interfaces of pedagogical and discipline-specific communities of practice. The results of this dissertation connected informal pedagogical change agency to research on professional developers (Roche 2001; Smyth 2003; Remmik et al. 2011) and academic leaders (Knight & Trowler 2000; Shields 2010), with the utilisation of social and communication skills being a way of promoting pedagogical development in both. Further, the results suggested that informal change agency could be supplementary to the institutionalised means of promoting pedagogical development in higher education. The informal change agent activities identified in this dissertation provided a basis for establishing integrated development activities between professional developers and change agents without an institutionalised developer position (see also Blackmore & Blackwell 2006).

According to the results, the work of institutionalised academic leaders affects academics' opportunities for acting as a change agent in terms of adequate resources, access to relevant information, and opportunities to take part in formal decision-making. These opportunities are crucial for promoting pedagogical development beyond the individual level (see also Gibbs 2013). The results revealed that if the work of institutionalised academic leaders invalidated the informal change agent activities, other disciplinary community members were hesitant to take part in any further pedagogical development activities and the change agents were uncertain about how they could contribute to the organisational transformation. However, as also suggested by Annala and Mäkinen (2016), the successful implementation of organisational transformations requires collective pedagogical development at all organisation levels. In addition, it requires ways of connecting the organisational development processes with individual teacher development (see also Gibbs 2013) in local disciplinary communities of practice. Previous research has emphasised the guiding effect of institutionalised leadership on organisational development practices (see e.g. Gibbs, Knapper, & Piccinin 2008). This dissertation identified change agency as a way of supplementing the work of institutionalised leaders by promoting alignment between individual and organisational processes of pedagogical development.

The work of the informal change agents particularly supported the early stages of transformative learning processes of their disciplinary colleagues. Enriching the disciplinary dialogue with alternative pedagogical meanings, practices, identities and ways of belonging to the disciplinary community lowered the threshold to critically evaluate the disciplinary teaching traditions and encour-

aged attendance at pedagogical development courses and other institutionalised development activities. The change agents' activities at the interfaces of pedagogical and disciplinary communities of practice also improved the discipline-specific conditions related to the most critical aspect of pedagogical development courses, namely the transfer of learning back to the disciplinary community (see also Ginns, Kitay, and Prosser 2010). Particularly for those academics that became aware of the need for pedagogical development during pedagogical development courses, the early stages of transformative learning were sensitive to the conditions of the discipline-specific community, such as the level of collegial encouragement and the number of opportunities for successful experimentation with new teaching methods (see also Remmik & Karm 2012). Change agents also focused their development efforts on those disciplinary community members that were not involved in the pedagogical community of practice and, as also noted by Gibbs (2013), that may be difficult to reach by professional developers working outside the community. The results suggested that simultaneous membership in both pedagogical and discipline-specific communities of practice provides the change agents with unique development opportunities in the context of organisational transformations.

In contrast to previous studies on change agency as an institutionalised form of organisational development of (see e.g. Caldwell 2003), the results of this study shed light on more proactive, integrated, and adaptive ways of acting as a change agent without an institutionalised developer or leadership position. The results contribute to an increasing body of empirical research on academics' change agency as a way of promoting organisational change (McGrath 2017), developing the curriculum (Louvel 2013), connecting the academic communities (Macfarlane and Chan 2014), and triggering academic development (Mårtensson 2014), drawing attention to the diverse collection of potential contributions change agents can make to shared pedagogical practices, meanings, identities, and ways of belonging to disciplinary communities of practice. The results also challenge previous studies that have questioned academics' ability to promote pedagogical development outside their own courses and organisational positions (see e.g. Mårtensson & Roxå 2016). The application of a community-level approach, also widely supported in previous studies (see e.g. Knight & Trowler 2000; Brew 2002; Warhurst 2008; Remmik 2013; Annala & Mäkinen 2016), enabled the identification of a wide variety of means for the change agents to contribute to pedagogical development at the interfaces of pedagogical and disciplinary communities of practice.

6.2 Limitations and transferability of the results

This subchapter examines the extent to which the findings of this dissertation can be transferred to other settings as well as the applicability and usefulness of

the findings among faculty, professional developers, and academic leaders. The data for this study were collected within one Finnish university among a limited number of academics from the field of engineering education. The findings are based on two datasets and four sub-studies with their own focus on investigating particular topics related to pedagogical development in higher education. The data enable a comprehensive analysis of the processes of developing as a teacher and acting as a pedagogical change agent among the studied group. Studies I–IV together form a holistic picture of how pedagogical development results from academics' activities at the interfaces of communities of practice.

Variation in the stages of the participants' academic careers and processes of transformative learning could have affected their interpretations of the organisational development opportunities. It is possible that the same participants could have provided different descriptions in earlier or later phases of their academic careers. Moreover, the perceptions of the role of pedagogical development courses could have been more positive for those academics that had recently finished the training than for those that had had more time to experience their subsequent effects within the discipline-specific community of practice. The dissertation does not explore the nature of the discipline-specific communities of practice that provided a context for the reported development experiences. It is possible that interviewing academics from other university departments could have resulted in different descriptions. However, the findings shed light on the wide variety of academics' pedagogical development experiences at different stages of academic careers and transformative learning, as well as in different discipline-specific communities of practice.

The empirical data of this dissertation are situated in a context of organisational transformation, during which the former technical university was merged with two other universities and an organisation-wide degree reform was implemented in all schools of the newly merged university. The participants' anticipation of possible layoffs and increasing workloads related to the upcoming merger could have affected the overall tone of the reported development experiences. The degree reform processes increased pedagogical development pressure at all levels of the newly merged university and provided a fruitful basis for exploring the work of academics as informal change agents. The opportunities for promoting pedagogical development without an institutionalised developer or leadership position could have been more limited in a more stable organisational situation. It is also possible that the organisational development pressure affected the disciplinary community members' receptiveness towards the change agents' development initiatives. Perhaps a more stable organisational situation could have resulted in more positive – or more negative – descriptions of pedagogical collaboration.

This dissertation is limited to the perspective of the academics themselves and does not explore the perspectives of their colleagues, students, organisers of

pedagogical development programmes, or academic leaders. It is possible that some of the reported development efforts were poorly justified, planned, or implemented from the perspective of other organisation members. It is also possible that the participants were unaware of other organisational enablers, such as pedagogical support services or additional funding that could have been utilised in their development efforts. While this dissertation does not explore the role of change agents in organisational transformation, the findings reflect the participants' perception of the organisational development possibilities that guided their activities in a context of the transformation. The findings are transferable to other research-intensive universities within which the academics may engage in formal or informal pedagogical development by establishing memberships in both pedagogically oriented and discipline-specific communities of practice. The findings are also transferable to contexts of organisational transformation, during which universities rely on their faculty to contribute to developing the quality of teaching.

6.3 Theoretical implications

The first theoretical implication drawn from this dissertation concerns the interconnectedness of communities of practice (see Wenger 1998) in the context of higher education. In contrast to the traditional view of academic communities as independent entities separate from each other, this dissertation approached them as an interconnected network with fluid, overlapping boundaries (see also Mårtensson 2014). Supplementary to Wenger's (1998) emphasis on community boundaries as sources of development, pedagogical development was approached as reciprocal, iterative processes at the interfaces of academic communities of practice. *The conceptual framework enabled a comprehensive analysis of academics' experiences of pedagogical development as an interplay between different communities of practice rather than a one-directional transfer of learning from one academic community to another.*

The second theoretical implication concerns the two qualitatively distinct yet interconnected contexts of pedagogical development identified in this dissertation: pedagogically oriented and discipline-specific communities of practice. While previous studies have acknowledged the existence of various academic communities of practice (see e.g. Annala & Mäkinen 2016), theoretical conceptualisation of their nature and role in relation to pedagogical development has been lacking. By focusing on academics that possess simultaneous membership in both pedagogical and discipline-specific communities, this dissertation shed light on the opportunities for and obstacles to pedagogical development at the interfaces of these two communities. *The chosen approach broadened Wenger's (2000) definition of brokering from establishing new connections with external*

communities to promoting transformative learning (see Mezirow 2000) within a network of communities of practice.

The third theoretical implication pertains to informal change agency as a way of promoting pedagogical development without having an institutionalised developer or leadership position. The findings supplement previous research on academics as informal change agents among their colleagues and students (e.g. Doring 2002) as well as in relation to curriculum development (e.g. Louvel 2013). *Conceptualising change agency as an informal development activity broadens the perspective of previous studies that have approached change agency as an institutionalised development activity available mainly for organisational leaders and professional developers (see Caldwell 2003).* The resulting description of academics as informal pedagogical change agents provides a basis for further studies of pedagogical development in higher education.

6.4 Educational implications

Universities and academic leaders

The results of this dissertation implied that in the face of organisational transformations, universities might benefit from developing institutional leadership strategies to make use of and support academics' processes of pedagogical development at the interfaces of pedagogical and discipline-specific communities of practice (see also Gibbs, Knapper, & Piccinin 2008). Such strategies would extend the role of academic leaders from pedagogical decision-making into creating pedagogical development opportunities in a network of academic communities of practice (see Blackmore & Blackwell 2006). Universities might also benefit from establishing organisational structures and career systems that allow academics to share responsibility over pedagogical development beyond organisational boundaries and hierarchical structures without risking their opportunities of academic career advancement (see also McGrath 2017). For example, emphasising contributions to organisational development as a part of academics' professional competence in academic tenure track systems and reward policies might increase the number of change agent activities in higher education.

Instead of increasing the number of centrally located, institutionalised pedagogical development activities during organisational transformations, universities are encouraged to accelerate informal change agent activities at the interfaces of pedagogical and discipline-specific communities of practice. As also suggested by Hannah and Lester (2009) in reference to organisational knowledge catalysts, academic leaders could leverage informal change agency as a part of institutionalised development strategies by purposively supporting the development of pedagogical change agents in academic communities of practice and ensuring that the informal change agents occupy key developer and leadership positions in their respective communities. Leaders may also embed pedagogical

change agents in positions that out of necessity require promoting interaction at community interfaces. In order to avoid incongruence between institutionalised and informal community-level development activities and experiences (see also Pielstick 2000), academic leaders are advised to ensure that the university-level pedagogical vision is also shared and discussed among those academics that do not have an institutional developer or decision-making position.

Professional developers

Based on the results of this dissertation, professional developers are encouraged to extend their role from organising pedagogical development courses into facilitating academics' processes of developing as a teacher and acting as a pedagogical change agent. As the development processes are situated at the interfaces of pedagogical and discipline-specific communities of practice, they might be difficult to reach without legitimate community membership. While typically lacking membership in disciplinary communities, professional developers may be well advised to collaborate with local academic leaders and informal pedagogical change agents (see also Whitchurch 2008). Collaboration between institutionalised and informal change agents is particularly critical during university transformations that require efficient and well-aligned development efforts at all organisational levels (see also Annala & Mäkinen 2016).

Conceptualising pedagogical development as a shared responsibility between institutionalised and informal change agents would encourage professional developers to break out of centralised institutional development units and identify themselves as members of pedagogically oriented communities of practice. As pedagogical community members, professional developers are encouraged to design pedagogical development activities that are closely connected with academics' activities and experiences in discipline-specific communities of practice (see also Gibbs 2013). For example, pedagogical mentoring in local academic communities has proved to be one of the most effective forms of pedagogical support especially among novice lecturers (see Warhurst 2008; Remmik et al. 2011; Remmik 2013).

Faculty

In order to develop as teachers, academics may be well advised to leverage opportunities of being exposed to different academic communities by, for example, visiting other departments and universities as well as collaborating with industry. In addition to taking part in centrally located pedagogical development courses, academics are encouraged to critically reflect on their disciplinary teaching traditions by, for example, collecting and analysing student feedback, observing other academics' teaching, and taking part in collaborative teaching activities, such as interdisciplinary courses and study programmes. Instead of replicating the way they were taught in their own disciplinary studies, academics should make pedagogical experimentation an integral part of their teaching (see also

Remmik & Karm 2012), extending their inquisitive approach within their research to teaching. Sharing successful and unsuccessful development experiences might contribute to abandoning the traditional view of teaching as a 'private business' and encourage colleagues to join development efforts.

The results of this dissertation also encourage academics to take advantage of the informal organisational development opportunities outside of their institutional positions (see also Mårtensson 2014). Academics could utilise their legitimate membership in a disciplinary community of practice to seek an internal mandate for pedagogical development and influence local decision-making through discussion. In order to increase the influence of their development efforts, academics would benefit from developing competencies related to, for example, persuasive communication and transformative leadership (see also Weick & Quinn 1999). Academics could also leverage their membership in a pedagogical community of practice by applying for institutional development and decision-making positions that require pedagogical expertise (see also Gibbs 2013). In addition, academics may be well advised to familiarise themselves with the pedagogical vision and strategy of the university and to direct their informal development efforts towards supporting the implementation of institutional development strategies in a constructive way during periods of organisational transformation.

6.5 Suggestions for future studies

The first question raised by the findings of this dissertation is related to the specific aspects of academic communities of practice that affect academics' opportunities for developing as teachers and acting as change agents to promote pedagogical development. Comparative studies are needed to identify possible differences in pedagogical development opportunities between various pedagogical and discipline-specific communities. In addition, multi-institutional studies are encouraged to investigate the extent to which the current findings are applicable in different institutional contexts. The dissertation provides a theoretical and empirical basis for further longitudinal follow-up studies on academics' pedagogical development opportunities in other contexts of university transformation as well as in more stable organisational situations. Further studies in other institutional contexts might also reveal new academic community memberships that contribute towards academics' pedagogical development and supplement their experiences in pedagogically oriented and discipline-specific communities of practice.

The second question raised by this dissertation concerns those academics that are not attending any pedagogical development programmes, with limited or no access to pedagogical communities of practice. Further studies of a similar design are required to identify the extent to which the findings of this dissertation

are applicable to academics' experiences of pedagogical development outside centralised university-level development courses. Further studies are also needed to investigate the nature of educational change resulting from academics' activities specifically at the community interfaces. For example, studies on the effects of pedagogical change agency are required at community and organisational levels. These studies could apply a qualitative approach to explore the viewpoint of other organisational members, such as disciplinary colleagues, students, professional developers, and academic leaders, that are affected by informal change agent activities.

Finally, the findings also raise a third question related to the possible connection between the processes of developing as a teacher and acting as a pedagogical change agent. A narrative approach could be applied to identify academics' trajectories from becoming a university teacher to acting as an informal change agent. In addition, longitudinal research settings are encouraged to further specify the various triggers, organisational enablers, and obstacles to pedagogical development as well as their effects on the outcomes of academics' development efforts. Further studies on pedagogical development in higher education would benefit from broadening their focus from either centrally located pedagogical development courses or discipline-specific development initiatives to their mutually defining interplay and long-term effects on disciplinary teaching traditions at a community level. In addition to exploring academic leaders and professional developers in the capacity of change agents, further studies are encouraged to approach academics' own activities as a source of individual as well as organisational development.

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