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Institute of Social Studies, University of Tartu

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LIST OF ORIGINAL PUBLICATIONS

This dissertation is based on the following five original publications, which are called studies in the following cover article and will be referred to with Roman numerals:

I **Karaseva, A**., Pruulmann-Vengerfeldt, P., Siibak, A. (2013). Comparison of Different Subject Cultures and Pedagogical Use of ICTs in Estonian Schools. *Nordic Journal of Digital Literacy (3)*, pp. 157–171.

II **Karaseva, A**., Siibak, A., & Pruulmann-Vengerfeldt, P. (2015). Relationships between teachers' pedagogical beliefs, subject cultures, and mediation practices of students' use of digital technology. *Cyberpsychology: Journal of Psychological Research on Cyberspace*, 9(1), no page number.

III **Karaseva, A**. (2016). Relationship of Internet self-efficacy and online search performance of secondary school teachers. *Procedia – Social and Behavioral Sciences* (231), 278–285.

IV **Karaseva, A.,** Siibak, A., & Pruulmann-Vengerfeldt, P. (accepted for publication). Relationships between in-service teacher achievement motivation and use of educational technology: case study with Latvian and Estonian teachers. *Technology Pedagogy and Education*, xx(x), pp–pp.

V **Karaseva, A**. (2016). Pedagogy of connection: teachers' experiences of promoting students' digital literacy. In O. Erstad, K.Kumpulainen, Å. Mäkitalo, K. Schrøder, P. Pruulmann-Vengerfeld, & T. Jóhansdóttir (Eds.) *Learning across contexts in the knowledge society*. Rotterdam, The Netherlands: Sense Publishers.

AUTHOR'S CONTRIBUTION

The contribution of the author of this doctoral thesis to the publications below is as follows:

Study I: this is a jointly written article. The author was responsible for writing the theoretical framework and describing the national contexts.

Study II: this is a jointly written article. The author had a leading role in developing the theoretical framework, interpreting the research results and writing the discussion.

Study III: this is a study fully initiated and designed by the author. The author is fully responsible for the manuscript.

Study IV: this is a jointly written article. The author had a leading role in developing the theoretical framework, interpreting the research results and writing the discussion.

Study V: this is a study fully initiated and designed by the author. The author is fully responsible for the manuscript.

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INTRODUCTION

Educational systems worldwide constantly change (Fullan, 2007) due to major societal, political and cultural shifts related to changes in production, consumption, economic life, political relations, information, communication and technology (Hargreaves, 1994, 2000; Selwyn, 2011). The focus of my doctoral thesis is on, perhaps, one of the most persistent and long-standing changes in teachers' work: attempts to integrate information and communication technology (ICT)[1] into subject teaching. On the policy level worldwide, for decades schools have largely been seen as means of preparation of a skilled and ICT literate workforce able to apply technology in work and life (Apple, 1994; European Commission, 2014; Ward, 2012). This is connected with the notion of ICT as an integral part of every school subject (Haydn, 2010; Tondeur et al., 2007). Therefore, subject teacher responses to pressures related to ICT integration in teaching have been an issue of interest for quite some time. However, only recently has there been an increasing tendency to acknowledge teacher agency in the process of educational changes (Priestley, Biesta, & Robinson, 2015), including changes related to ICT integration in teaching.

The aim of this doctoral study is to explore how teacher professional agency is manifested in the ways teachers navigate within the different personal, situational, social and contextual factors related to digital technology integration in teaching in Latvian and Estonian schools. The topicality of my dissertation lies in the fact that teachers in Europe generally are free in deciding about their instructional approaches (Eurydice, 2008; Priestley et al., 2015). The general tendency is to move away from standardisation and job demarcation in the teaching profession, which is characteristic of the period of modernity (Hargreaves 1994:48). However, teachers report being increasingly exposed to tightening performativity measures, external evaluation systems, accountability rules and curriculum requirements (Hargreaves, 2000), which include pressures to integrate ICT into subject teaching (Selwyn, 2011). Therefore, it is not surprising that some have expressed the need to reclaim "teacher agency in a computer-mediated, digital world" (Kimber, Pilley, & Richards, 2002:155).

Every change includes decisions about the path to be taken and others to be avoided. Unfortunately, in the context of ICT policy adaptation, the literature often conceptualises teacher agency in two extremes: teachers are either more or less enthusiastic implementers of externally formulated innovation policies, or are resistant to policy messages (Heijden, Geldens, Beijaard & Popeijus, 2015; Leander & Osborne, 2008; Sannino, 2010; Selwyn, 2011). This is due to the

[1] The terms "digital technology" "technology" or "information and communication technology" (ICT) in this introductory article, unless otherwise specified, are used interchangeably, as synonyms. I use them as "umbrella" terms, and they all refer to various kinds of computer- based systems, either hardware or software, including Internet-based applications and services.

common tendency that changes and reforms are largely designed and imposed on teachers in a top-down approach (Luttenberg, van Veen, & Imants, 2013), and the role of teachers as active mediators of policy reform is neglected (Selwyn, 2011). Fullan (2007) has stated that perceiving teachers as mere "servants" in the change process is the wrong approach: it leads to the refusal of teacher agency and denies their key mediating role in the implementation of any change proposals in the schools. Some recent studies (see, e.g., Kello, 2014; Ketelaar, Beijaard, Boshuizen, & Den Brok, 2012; Vähäsantanen, 2015) consider teacher professional agency in relation to educational changes, and demonstrate a broader perspective. These studies conceive teacher agency as an emergent phenomenon connected to influences stemming from specific social, political and economic contexts, and resourced by a range of personal factors, such as pre-existing beliefs, attitudes, experience and established practices (Coburn, 2004; Selwyn, 2011). My doctoral study is a contribution to this latter type of research, which concentrates on examining teacher agency within particular contexts and as related to particular personal, social and situational influences. It is important to note that in the following chapters of the introductory article I address teacher agency only as direct personal agency (Bandura, 2001), not dealing with other aspects of agency, such as collective or proxy agency (ibid.).

The theory of social domains developed by the sociologist Derek Layder (1993; 1997)[2] has been chosen as the theoretical framework to inform this introductory article. I give a detailed explanation of the central premises of this theory below, in Section 2. Although the theory of social domains has not been employed in any of the individual Studies which comprise my doctoral dissertation, due to its emphasis on the multidimensionality of social life, it has served as a "research map" (Layder, 1993:8) through the different stages of developing my doctoral thesis. In addition, in this introductory article it has served as a theoretical foundation to form the necessary interconnections between the individual Studies, which comprise my doctoral study. Hence, drawing on the theory of social domains (Layder, 1993; 1997), it is possible to ask two main research questions:

(1) How are the influences of various social domains related to technology integration in teaching?

In order to answer the first research question, the following sub-questions concerning the influences of specific domains are posed:

In the domain of psychobiography:

- How are perceived self-efficacy and other teacher beliefs related to teachers' usage of ICT? (Studies II and III)

[2] One should be careful not to associate Layder's theroetical framework with the domain approach to children's moral development (e.g., Turiel, 2008; see also Nucci, 1981; Smetana, 1981a, 1981b), which is a theory widely applied in the field of psychology.

- What influences do achievement goals have on teachers' motivation to learn about ICT? (Study IV)

In the domain of situated activity:

- What are teachers' roles in the mediation of students' use of digital technology? (Studies I and II)
- How do subject teachers promote students' digital skills? (Study V)

In the domain of social setting:

- What are the influences of school subject cultures on the ways in which teachers integrate technology in their teaching? (Studies I, II and V)

In the domain of contextual resources:

- How do such contextual factors as a centralised examination system and curricula requirements shape the ways in which teachers integrate technology into their teaching? (Studies IV and V)

(2) How is teacher agency in technology integration manifested when teachers navigate within various personal, situation, social and contextual influences? This question follows up on the idea of teachers as active agents who take stances, make choices and actively navigate (Bamberg, 2010) within the various personal, situational and social enabling and constraining factors which stem from different orders of social life (Layder, 1997). My aim in posing this question was twofold. Firstly, I wanted to present the findings of the individual Studies in a coherent way and stress how my understanding of the individual-structure relationship has evolved and shifted from probably a too individualistic approach to a more socio-cultural perspective on human activity since publishing the first individual Study. Secondly, my wish was to support the existing body of research, which avoids the "pro-change versus con-change" conceptualisation of teacher agency, instead picturing the broadness of the spectrum of teachers' responses to educational reforms. To answer the second research question, in this introductory article I propose a new typology of teacher agency manifestations, which is based on a meta-analysis of the initial research findings reported in the individual Studies I–V.

My doctoral study was conducted in Estonia and Latvia. These two countries are interesting examples of exploring ICT integration in teaching for several reasons. First, since the collapse of the Soviet Union in 1991, digital tools on the policy level have been addressed as a powerful means of "catching up" with the West economically and culturally (Runnel, Pruulmann-Vengerfeldt, & Reinsalu, 2009). Such notions have fuelled the process of rapid "internetisation" of schools, starting in the mid-90ties via initiatives such as "Tiger Leap" in Estonia (UNDP, 2003), and the "Latvian Education Informatization System" in Latvia (Bicevskis, Andzans, Ikaunieks, Medvedis, Straujums & Vezis, 2004). These programmes focused on equipping schools with digital technology, connecting them to the Internet and training teachers in ICT skills, envisioning digital technology being used in every school subject (Mägi, 2006; Kangro & Kangro, 2004). Nowadays, national curricula in both countries define digital

competencies among other core competencies (Latvian Ministry of Education and Science, 2013; Estonian Ministry of Education and Research, 2011). Similar to colleagues in other European countries, teachers in Latvian and Estonian schools are granted autonomy in deciding about teaching aids, instructional methods and the organisation of the classroom process. However, as research shows, the policy context for teacher work is tightening and teachers repeatedly report a decrease in their feeling of autonomy (Erss, 2015; Kello, 2014; Loogma, Kesküla, & Roosipõld, 2010). This happens due to growing demands related to pressures to innovate and keep up with recent societal, cultural and technological changes, including the development of digital technology, and with various measures of teacher accountability and responsibility, e.g. concerning student scores on centralised exams (Loogma et al., 2010; OECD, 2009).

The five individual Studies that make up my doctoral thesis mainly utilise the same empirical evidence: data from 26 semi-structured interviews with different subject teachers in Estonia and Latvia (Studies II, IV and V), in combination with class observations (Study I) and a study of teacher online search behaviour (Study III). In developing the individual Studies, the principles of analytical pluralism (Frost & Nolas, 2011) were followed. Namely, use was made of various theoretical frameworks and concepts of different disciplines, such as psychology, communication studies and pedagogy, relying on the assumption that "a data set can tell us about a number of different things, depending on the questions we ask of it" (Willig, 2013:19). In the individual Studies, the professional use of ICT by different subject teachers was explored in relation to a set of professional beliefs and attitudes, including self-efficacy beliefs (Studies I, II, III and V), as well as future aspirations: professional achievement goals and motivation to learn about ICT (Study IV). Teacher-student interaction was analysed in the forms of instructional styles (Study I) and mediation practices of student's use of digital technology (Study II). School subject cultures and their influences on teachers' practices of ICT use were examined in three Studies (Studies I, II and V). In the domain of contextual resources, the influences on teachers' ICT practices were analysed in terms of the pressures to prepare students for graduation exams and to fulfil curricular requirements (Studies IV and V). Therefore, my doctoral study should be seen as an interdisciplinary work.

Three of the individual Studies (Studies I, II and IV) were written jointly with my PhD supervisors, Professor Pille Pruulmann-Vengerfeldt and Professor Andra Siibak. The remaining two, Studies III and V, were solely designed and written by me.

The introductory cover article is structured as follows: the first part gives an overview of the central premises of the theory of social domains and the concept of agency and teacher professional agency in particular. In the second part, the societal, political and cultural contexts are outlined, including specific aspects related to digital technology integration in Estonian and Latvian schools. In the third part, the methodological part of the Studies is described. In the fourth section, I present the empirical findings, followed by the Discussion and Conclusions.

I THEORETICAL CONTEXT OF THE STUDY

1.1. Reconsidering the relationship between structure and the individual: The theory of social domains

The theory of social domains of Derek Layder (1993; 1997; 2013) is the overarching theoretical framework informing my doctoral study. Layder's theoretical notions condensed in this theory have similarities to other approaches to social analysis, such as Parson's research on the layered constitution of systems, Giddens's conceptualisations of human agents. It has similarities with Habermas's distinction between lifeworld and systems, and Goffman's research on face-to-face interactions (a thorough examination of the similarities, overlapping elements and oppositions to other social theories is given in Layder, 1997:9–13). However, Layder firmly states (1997:19) that the theory of social domains is not a theory about society as such; rather, its concern regarding society in a larger sense goes as far as is needed to understand human activity. In a broader sense, it establishes a balance in the way in which the central issues of social analysis – the distinction between the micro and macro dimensions of social life, and the relationships between these two – are approached. The central claim of the theory of social domainsof Layder is that social life consists of four distinct yet interrelated domains (Layder also calls them orders and sometimes dimensions): the domains of psychobiography, situated activity, social setting and contextual resources (Layder, 1997). A merit of Layder's theoretical framework is that, besides acknowledging the interrelatedness of the various domains, it denies that there is a stable hierarchy between them. Thus, in the analysis of people's activities, according to Layder (1997; 2013) a similar weight can be given to various personal, societal and contextual influences. Hence, the application of the social domain theory makes it possible to take a "middle-ground" approach (Coburn, 2004) in recognising the subjective and objective factors which shape and re-shape human activity. Compared to previous conceptualisations, Layder (1997) does not emphasise practices as the dominant aspect of social research, and therefore the social domain theory helps to take a broader look "behind the scenes": to reveal how complex the process is in which the practice is actually conceived. Hence, in my doctoral study, the theoretical notions of social domain theory inform the analysis of teacher agency in relation to ICT from multiple research points which allow me to capture the various directions that teacher agency can take in the context of the dynamic interrelationship between individuals, technology, and social structures. Below, I will, first, introduce the theory of social domains in brief, and then discuss the agency-structure relationship as it is outlined by Layder (1994, 1997).

According to Layder (1997), the domain of psychobiography refers to the individual's personal aspects, the notion of self. The domain of psychobiography has two dimensions: 1) the individual's experience, attitudes, beliefs,

opinions, knowledge etc., which are collected and formed throughout life, and 2) the future aspirations, and personal and professional goals that people strive to achieve (Layder, 1997). Layder (1997; 2013) highlights the interaction of these two different dimensions, and the need to take them both into account when studying human activity. It is important to note the role of context in the formation of the domain of psychobiography: according to Layder, the individual's sense of identity and personality, and the perception of the social world should be seen as being shaped by his or her social experience (Layder,1993:74). Layder (1997) stresses that it is erroneous to adopt the individualistic psychology view of the individual as being independent and separate from the social environment, while at the same time he warns about falling into the trap of "social constructionism", over-emphasising the socially constructed nature of the self. Therefore, Layder's (1997) understanding of the formation of the domain of psychobiography is especially useful in analysing the intersection of the teacher's individual psychological characteristics and the changing surrounding sociological circumstances, and in understanding the dialectics between the two. What is important to bear in mind in reading the individual Studies which comprise my doctoral research is Layder's notion of the "mental interior of a person as intrinsically both psychological and social in nature" (Layder, 1997:27). In the individual Studies, on the iterational (past-orientated) dimension of the domain of psychobiography, various teacher beliefs were analysed, such as ICT-related self-efficacy beliefs (Hargittai, 2006; Voogt, 2010) (Studies II, III and IV), and beliefs about the nature of technology and the nature of learning (Study II). On the future-orientated dimension, a framework of teacher achievement goals consisting of mastery, relational, ability-approach, work-avoidance and ability-avoidance goals (Butler, 2007, 2012) was applied to explore the relationship between teacher achievement goals and teacher ICT practices and motivation to learn about ICT. A detailed description of Butler`s teacher achievement goal model is provided in Study IV.

The domain of situated activity (Layder, 1997) refers to everyday interaction between individuals. Layder describes it as the domain of "focused gatherings": situations that arise when two or more people share each other's company for a purpose. Layder (1997) notes that what happens during these "focused gatherings" at the face-to-face level depends upon how participants formulate their conduct in the light of their own behaviour and intentions and of those of the other people who are present. At the same time, behaviour and practices are underpinned by an elaborate fabric of rules, understandings, obligations and expectations related to the broader social context (Layder, 2013). The idea of interaction between partners can be extended to situations where the interaction happens between a teacher and a piece of technology: thus, understanding how teachers interpret an interaction "partner" and its role in a situated activity is vital. In sum, Layder (1997) insists that this domain can only be understood by analysing the subjective properties of the individuals involved, and at the same time by taking into account the broader context of social organisation. Layder notes that schools are institutions where situated activity is heavily regularised

and they depend on the influences of other domains. Therefore the modes of operation of engaged individuals are connected to prescribed codes of conduct. In the individual Studies comprising my doctoral thesis, most of the attention was paid to interactions happening between teachers and students, and teachers and technology. In particular, it was studied how teachers mediate students' use of digital technology (Study II), and how they promote students' digital skills (Study V). I rely on the assumption that the core of teacher professional daily activity consists of working with students, with little interaction with other people (Luttenberg et al., 2013). Additionally, teacher-technology interaction was studied in Study III by exploring teachers' practices of information retrieval online, recognising that the Internet has become a prominent source of information among educators (Shipman, Bannon & Nunes-Bafford, 2015).

In terms of social organisation, according to Layder (1997) the closest to face-to-face encounters and everyday negotiations is the domain of social setting. This refers to proximate, specific locations where human interaction takes place. Here the focus has shifted from individuals to workplaces, where the social activities and social practices of people are situated. In this doctoral thesis, the subject departments in schools were explored in Studies II, III and V as representations of the domain of social setting. This was due to the fact that school subjects and the cultures which grow around them are largely seen as social frameworks or social communities (Hennessy, Ruthven, & Brindley, 2005) characterised by specific approaches to teaching and learning, and choices of tools and resources. Subject cultures in the individual Studies II, III and V were approached as frameworks for the "vision for technology use and definitions of 'good' teaching" (Ertmer & Ottenbreit-Leftwich, 2010: 266–267).

The fourth domain, according to social domain theory (Layder, 1997), is the domain of contextual resources. It can be understood as a set of economic, political and cultural resources and various forms of hierarchy and inequality on a society-wide basis related to the structure of possession, distribution and ownership of these resources. Bourdieu's (1977) notion of social fields is perhaps the most compatible with the theory of social domains in this thesis (Layder, 1997:116). However, the notion of contextual resources in my dissertation was employed according to the specific foci of the individual Studies, paying attention to the norms and rules that refer specifically to the educational sector and teachers' daily work, since Layder (1997) insists that occupational structures presuppose the establishment of various sub-fields in the general structure of contextual resources. In the domain of contextual resources, the influences of two factors – curricular requirements and high-stakes exams – were explored in Studies IV and V.

One central claim in the social domain theory is that all four domains, although referring to different layers of social life and having their own distinct properties and a certain measure of independence from each other, are strongly interrelated and connected through power, social relations and practices (Layder, 1997). Figure 1 is a visual representation of the interrelatedness of the four domains.

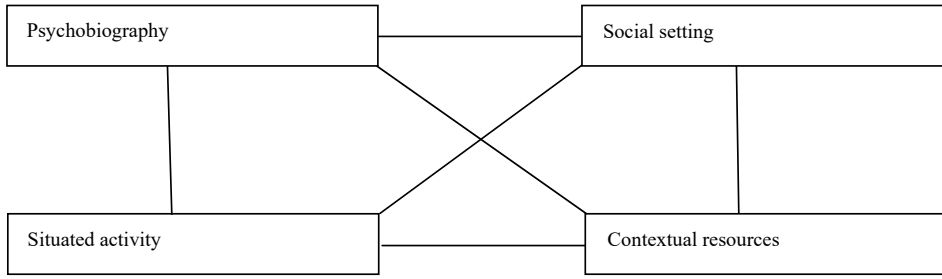


Figure 1. Social domains and the interrelatedness between them (adapted from Layder, 1997:87)

According to Layder (1997), power is an inherent feature of every social domain. In the domain of psychobiography, it is represented in the construction of self-identity, which serves as a lens to filter the availability of resources and mediates the uptake of resources of the other social domains. Thus, in the context of my dissertation, it becomes understandable why teachers in similar situations interpret the situation and the influences differently, thus reacting differently. However, according to Layder (1997) psychobiography and interaction between individuals does not cause or determine the functioning of social setting or the contextual environment. In fact, the opposite is true: Layder (1997) insists that systemic factors do not determine the psychologies of individuals, nor do they determine the nature of interpersonal encounters. Layder (1997:19) suggests that there are collective properties of social life which emerge historically to "form objective features that provide a wider background context and the immediate settings of activities". Layder (1997) goes on to stress that these contextual and societal features precede human actors and their everyday encounters. This happens, for example, through attempts to define permissible or "normal" behaviour and practices based on various discourses, and "construct forms of identity and subjectivity which in turn 'feed' into normalized forms of activity for individuals operating in particular social contexts" (Layder, 1997:151). In the theory of social domains, Layder (1997:131) suggests that human agency always operates within a broad network of sociocultural influences, which enable or constrain people's activities, and individuals should be seen as both producers and products of social systems. According to him, power is a "variegated phenomenon" (Layder, 1997:22) and should be taken as an integral part of social structures and contexts, as well as an aspect of human agency and the psychological make-up of individuals. Layder (1997) argues that such a multifaceted conceptualisation of power is the only one that adequately presents the ubiquitous nature of power, and helps to clarify the tensions and dynamic relationship between various domains of social

life and their implications for people's courses of action. Layder (1997: 131) insists that

> "from the discourses that are available to them, people are able to select and edit their influences and as a consequence, decide between various courses of action on the basis of their relevance to their circumstances in which they find themselves (…). At the same time, human beings have no real control of their cultural array of discourses (...), in a sense these are "enforced" by the distributive patterning that they [people] must confront and deal with in their daily lives as an ongoing feature of social systems".

If power spreads everywhere in a society, it is then also the key element binding together the various domains (Layder, 1997). Thus, power in Layder's (1997: 16) view in its different guises is "the lubricant which allows the multitude of interdependencies and couplings of domains to take place". In sum, such notions of power relations between social domains in the context of my dissertation indicate that teachers should not be seen as merely drifting in their profession, passively implementing externally defined policies. Instead, they should be seen as actively managing and mediating various influences and pressures. This brings us to the centrality of human agency in Layder's works, which I focus upon in the next section.

1.2. Human agency as bounded to individuals' capacities and to contexts

Layder (1997) insists that from the perspective of the theory of social domains, human agency should be seen as "bounded" both to the personal capacities of people and to the properties of social and contextual factors. According to Layder (1997), people exercise their power and their psychobiographical differences in order to achieve the desired ends. Layder (1997:20) argues that human activity should also be understood as "located within enveloping social fabric", which enters into and becomes an integral part of the fabric of people's daily social life. In this sense, the theory of social domains (Layder, 1993, 1997, 2013) shares many similarities with the structuration theory of Anthony Giddens, who conceptualises agency as the agent's ability to intervene in the world and make changes to current situations (Giddens, 1984). Layder (1997: 13) highlights the fact that people should be seen as active participants in social life, "engaged in grappling with, and transforming to **varying degrees** their immediate social circumstances" (emphasis in the original). Here one could also mention the works of such sociologists as Pierre Bourdieu (1977) and his notion of habitus, Jürgen Habermas (1989) and his distinction between lifeworld and system, and Archer's (1995) seminal writings on realist social theory. These authors all have offered solutions to the long-standing problem of the divide between action and structure, establishing a theoretical foundation to depict the

interrelatedness of the various orders of social life and their implications for human agency. Keeping this thought in mind, in the next sub-chapter I narrow the focus to the concept of teacher professional agency and its manifestations.

1.2.1. Teacher professional agency and its manifestations

Teacher professional agency in the literature has been related to teachers' power to make decisions, take stances and act accordingly to affect work-related matters (Hökkä, Eteläpelto, & Rasku-Puttonen, 2010; Ketelaar, Beijaard, Boshuizen, & Den Brok, 2012; Priestley et al., 2015; Vähäsantanen, 2015). Professional agency in teacher work often has been conceptualised in the Giddensian sense (see e.g., Giddens, 1984) as intervention and the transformation of existing situations (Eteläpelto, Vähäsantanen, Hökkä, & Paloniemi, 2013). Lipponen and Kumpulainen (2011) note that agency can also refer to strivings to maintain and reinforce the existing state of affairs. Speaking of the emergence of professional agency, recently the notion of teacher professional agency as being resourced both socially and individually (Lipponen & Kumpulainen, 2011; Vähäsantanen, 2015) has become prominent (Eteläpelto et al., 2013; Pantić, 2015). Several authors (see, e.g., Coburn, 2004; Lasky, 2005; Priestley, Biesta & Robinson, 2015) describe the emergence of agency as a process which is actively mediated by the pre-existing beliefs and practices of teachers, which, in turn, are rooted in encounters with institutional pressures, such as social structures, policies and norms. As Biesta and Tedder (2007: 137) emphasise:

> "this concept of agency highlights that actors always act by means of their environment rather than simply in the environment [so that] the achievement of agency will always result from the interplay of individual efforts, available resources and contextual and structural factors as they come together in particular and, in a sense, always unique situations."

Here we can draw several parallels with the notions of human agency in the social domain theory of Layder (1997), in which it is highlighted that in the domain of psychobiography individuals draw upon experiences and simultaneously strive for the achievement of particular future aspirations in deciding about particular courses of action. At the same time, systemic factors related to cultural, structural and material resources come into play, shaping the context in which individuals operate (Layder, 1997). This explains why teachers do not always act in habitual ways or follow routinised patterns of action (Eteläpelto et al., 2013).

If we consider the dynamic interplay between the various influences stemming from different layers of social life that teachers face in their work, it helps to explain how teachers create meaning, cope with professional challenges and make work-related decisions. This is the reason why, in my doctoral study, I pursue the idea of professional agency as something that teachers "do" instead of "have", i.e. this thesis draws on the notion of agency as active engagement of

involved individuals in contexts of action (Fuchs, 2001). It has been argued (Kelchtermans, 2009) previously that teaching should actually be seen as a very agentic profession: to be a teacher requires standing for something, taking stances and making decisions on how to navigate between various demands, pressures and norms posed by different stakeholders, and balancing these external pressures with personal goals and engagement in their achievement. But it would be wrong to reduce the manifestations of teacher agency to mere action. The "doing" of agency should be understood as the development of a wide array of stances, attitudes and opinions on capacities and the characteristics of the immediate circumstances and the wider context. As the TALIS 2013 survey (OECD, 2014) indicates, about two-thirds of teachers teach in isolation from their colleagues and almost never do any co-teaching or observe the work of colleagues. Hence, in my doctoral study, I rely on the assumption that the core of teacher professional activity consists of working and communicating with students (Luttenberg et al., 2013). As a result, in the empirical part of my study, teacher professional agency has been addressed as direct personal agency, not touching on the aspects of collective agency, which would be exercised through socially coordinative and interdependent effort, or proxy agency as reliance on others to achieve desired outcomes (Bandura, 2001).

My doctoral study focuses on teacher agency in relation to educational changes and particular attempts to integrate ICT into the teaching of every subject. If we talk about teacher agency within the process of change, it is argued to be related to two broad concepts: sense-making and teacher professional identity. Sense-making is understood as a process through which teachers mediate the implementation of educational policies and the changes that they bring about (Fullan, 2007), arriving at a broad spectrum of responses (Krüger, Won & Treagust, 2013; Luttenberg et al., 2013; März & Kelchtermans, 2013). The emergence of agency in the change process is often related to teacher identity: a sense of "who I am" coupled with future aspirations, i.e. "who I want to be" (Bamberg, 2010). This brings us back to the notions of self and the psychobiographical properties of people, as outlined by Layder (1997). The sense of professional identity is strongly related to teachers` perceived self-efficacy and motivation (Day, 2002; Flores & Day, 2006; Lee, Huang, Law & Wang, 2013). The notion of self also contains projections of desirable future trajectories in work and career (Emirbayer & Mische, 1998). In teacher studies, the concepts "agency" and "autonomy" are often treated as synonyms. In the context of my dissertation, the term "agency" has been chosen as the most appropriate term, in line with authors who see focusing on autonomy as a too individualistic approach leading to underestimating the social constraints that the emergence of agency implies (Archer, 2003; Priestley et al., 2015).

Existing literature stresses that teachers are not to be seen as simply accepting or rejecting educational changes imposed on them. Instead, recently the tendency to acknowledge that teachers actively position themselves in relation to new situations and make choices about their courses of action has increased (Spillane, Reiser & Reimer, 2002; Vähäsantanen & Eteläpelto, 2009).

The complex pattern of how teacher agency emerges in the context of educational changes is outlined by Coburn (2004:214):

> "teachers actively mediate messages about appropriate instruction from the environment (...). The environment influences the classroom practice in ways that are shaped by teachers' pre-existing worldviews and practices. These beliefs and practices, in turn, are rooted in a teacher's history of connections with and responses to past messages from the environment".

As mentioned in the Introduction, in relation to ICT integration in teaching, teacher agency is often conceptualised in two extremes: as either acceptance of/accommodation to change, or resistance to proposed policy. If we approach these two views as two opposite ends of a continuum, it is possible to ask: what happens between these two extremes? What other forms can teacher agency take? Table 1 provides an overview of some previous studies which have tried to capture the multiplicity of the ways in which teachers cope with various educational changes related to their everyday work and pedagogic practice.

Table 1. Examples of previous conceptualisations of teacher responses to educational reform, innovations and educational change (author's summary)

Study	**Types of teacher agency in relation to change or adaptation to educational innovation**	**Explanation of how the various types of agency are manifested in teachers' work**
Brain, Reid, and Comerford Boyes (2006; adapted from Merton, 1957)	Conformity	-policy is accepted fully, and the teacher does not mediate its implementation
	Innovation	-policy is accepted fully, but the teacher strongly mediates its practical implementation
	Ritualism	-policy is rejected, but the teacher develops practices to appear to be the implementer of policy
	Retreatism	-policy is rejected fully, no consequences on practice
	Rebellion	-rejection of the proposed policy and development of alternative approaches
Coburn (2004)	Rejection	-dismissal of policy-related approaches which are not congruent with teachers' beliefs
	Symbolical response/ Decoupling	-superficial adoption of reform components without fundamental changes in practice
	Establishment of parallel structures	-balancing competing approaches
	Assimilation	-fitting the policy within former practices
	Accommodation	-restructuring or reforming the previous practice in order to implement new approaches

Study	Types of teacher agency in relation to change or adaptation to educational innovation	Explanation of how the various types of agency are manifested in teachers' work
Luttenberg, van Veen, and Imants (2013)	Assimilation	-transformation of the external ideas in such a manner that they fit into teachers` own manner of thinking and acting
	Accommodation	-transformation of teachers` own thinking and acting to fit into externally proposed reform
	Toleration	- acceptance of the external reform without transformation of the existing practice
	Distantiation	-rejection of the proposed reform and maintenance of the existing practices
Stillman and Anderson (2015)	Appropriation	-active, agentic and learning-rich response to policy, stitching together multiple influences, re-authoring and co-authoring the policy, making it "one`s own"
Vähäsantanen and Billett (2008)	Active participation	-energetic implementation of the reform
	Professional development	-implementation of the reform, while hoping to improve inadequate competencies
	Balancing	- active engagement mixed with partial retreat to avoid exhaustion
	Withdrawal	- suspicious engagement with the reform, with probable disengagement from the reform
	Passive accommodation	- mere adjustment and toleration of the social demands
Vähäsantanen and Eteläpelto (2009)	Resistance	-being against the reform
	Inconsistency	-ambiguous response to the reform, and not taking a constant position
	Approval	-positive and enthusiastic inclination towards the reform
Kesküla, Loogma, Kolka, and Sau-Ek (2012)	Embracing new social norms	-appreciation of the proposed policy changes
	Accepting new norms due to institutional requirements	-feeling a need to comply with the new requirements, but with little enthusiasm
	Adapting the curriculum to one's own needs	-approaching some parts of the curriculum with cynicism, but appreciating other parts of it
	Not noticing changes	-failing to adopt the new norms because they are simply not noticed or blocked by management
	Doing things your own way	- not accepting the norms of the curriculum due to teachers' personal values or practices, or the overriding pressure of, e.g., national examinations
	Distancing from the reform	-ignoring the proposed changes or implementing on a superficial level
	Moral objection to the reform	-opposition to reform implementation due to moral values and concern for student well-being

As Table 1 indicates, previous studies have revealed quite varied teacher responses to educational reforms. What most of the studies highlight is that teachers strongly mediate the implementation of any changes, and it is crucial to acknowledge teacher agency for the changes to be successful. Because, as Brain et al. (2006) argue, what is least successful are prescribed policies with built-in goals and strict scrutiny mechanisms over the implementation process and results of the changes. For example, as the study of Kesküla, Loogma, Kolka, and Sau-Ek (2012) revealed, a curriculum reform can be totally neglected if it is at odds with the moral values of teachers, and their strivings to care for students' well-being at school.

Kesküla et al. (2012) focused on teacher responses to curricular changes in Estonia from the late 1980s to the late 2000s. This was the period when Estonia and the two other Baltic countries faced major transformations in numerous aspects of social life due to the collapse of the Soviet Union and opening to the West. It was a time when various changes in the educational systems in Estonia and Latvia started. In the next chapter, I discuss some cultural, societal and political challenges related to ICT integration in teaching, and provide an overview of the introduction of ICT in Latvian and Estonian schools since 1991.

II SOCIETAL AND POLITICAL CONTEXT OF ICT INTEGRATION IN TEACHING

2.1. Societal, political and cultural challenges related to ICT integration in teaching

Schools as institutions are deeply embedded in the fabric of social functioning and are strongly ideological and political (Apple, 1994; Ball, 1997; Birbirso, 2013; Selwyn, 2011). Therefore, in this chapter, my aim is to outline a few subjectively selected but in my opinion powerful political, societal and technological challenges that are imposed on teachers and their instructional choices regarding ICT integration through various formal, legal and informal frameworks. The coverage of this issue is not meant to be exhaustive; rather, my wish is to illustrate the complexity of the context in which teachers currently find themselves. Mainly I have linked the debate on ICT integration in schools to the principles of neoliberal thought, which promotes efficiency and productivity in the public sector, including education, and largely sees school systems as a means of the preparation of skilled and ICT literate work-forces. In addition, the emergence of student-centred learning approaches has been discussed by explaining how supporters of such learning approaches view technologies. I will conclude with some critical remarks on the concept of present-day students as representatives of the digital generation.

The general disappointment over the seemingly slow and unsatisfactory acceptance of digital technology in schools actually should not come as a surprise (Selwyn, 2011). According to the educational historian Larry Cuban (1993), the advent of personal computers in Western countries at the beginning of the 1980s can be compared to the introduction of radio and film into schools 60 years earlier and the appearance of instructional television in the 1950s and 1960s. Cuban points out striking similarities of "great expectations" and overly optimistic hopes accompanying these three technological shifts, arguing that predictions regarding the transformative power in education of new technological devices were pretty much the same a century ago as they are now. Cuban (1986:9) quotes Thomas Edison, who in 1922 argued that

> "...motion picture is destined to revolutionize our educational system and in a few years it will supplant largely, if not entirely, the use of textbooks. (...) on the average, we get about two percent efficiency out of schoolbooks as they are written today. The education in the future, as I see it, will be conducted through the medium of the motion picture... where it should be possible to obtain one hundred percent efficiency".

Almost 100 years later similar opinions are expressed regarding the transformative power of digital technology, with the notion that the development of digital technology represents a distinctly new and improved set of social arrangements (Selwyn, 2011). As Steve Woolgar (2002:3, quoted in Selwyn,

2011) has observed, “the implication is that something new, different and (usually) better is happening.” Nicholas Gane (2005:475, emphasis in original) has written:

> “It would seem to me that Internet-related technologies ***have*** directly altered the patterning of everyday life, including the way we work, access and exchange information, shop, meet people, and maintain and organize existing social ties. These technologies have done more than ‘add on’ to existing social arrangements; they have radically altered the three main spheres of social life, the spheres of production, consumption and communication.”

Some authors (see, e.g., Bolter & Grusin, 1999) talk about the “digital remediation” of every aspect of social life, where digital technology is seen as usurping various processes and practices by refashioning and transforming them, thus bringing desired changes to schools, which are often seen as too bound to traditional, conservative and protectionist values in teaching (Saul, 2016).

The optimistic hopes of the transformative power of ICT include recent educational reforms directed towards economic rationality (Cuban, 1993:187). The reform process is fuelled by neoliberal thinking, which in the last three decades has gained the dominant status in the world economy and in the public sector (Ward, 2012), including education. Several related aspects have emerged. Firstly, digital technology is largely seen as a means of helping to achieve higher productivity in the field of education for less money: in the words of Larry Cuban, “to teach more in less time for less cost” (Cuban, 1993:189). In neoliberalist thought, the quality of education is interwoven with economic prosperity, and computers and the Internet have long been portrayed as important drivers of economic developments and competitiveness in knowledge-based economies (Selwyn, 2011). This is why most ICT-related policies in Western countries demonstrate an inevitable tendency to some form of soft technological determinism (Selwyn, 2011). Secondly, school productivity involves schools as institutions being in charge of preparing skilled and technologically competent workforces for the labour market of the 21st century. Schools, and education in general, are largely seen as instruments to combat poverty, unemployment, economic stagnation etc. As a result, the use of educational technology to prepare digitally skilled workers is seen as connected with countries' success in global markets. In the words of Apple (1994): “we are repeatedly told that unless we have a 'technologically literate' work force we will ultimately become outmoded economically” (no page number). Thirdly, many argue that ICT competence should no longer be taught within specialised subjects, such as informatics or computer science, but should become an integral part of every school subject curriculum (Haydn, 2010; Tondeur et al., 2007). Informatics, or Computer Science, as a separate subject, which still exists in some European countries (Dagiene & Jevsikova, 2012), is criticised for being an outmoded practice of teaching de-contextualised skills (Buckingham,

2007). Subject teachers inevitably are seen as being responsible for the promotion of students' digital skills, such as computer skills and information literacy (European Commission, 2014), collaboration, problem-solving skills, creativity, communication and information-handling skills (Voogt & Pelgrum, 2005). In fact, such trends signal a considerable shift in thinking about teacher disciplinary expertise. Engeström, Engeström and Kärkkäinen (1995) proposed that the concept of vertical expertise assumes a uniform and singular model of what counts as "an expert" in the educational field. It was argued in Study V that subject teaching in the current context requires the opposite: the horizontal expertise to be able to teach in an interdisciplinary way. Hence, as was pointed out by Engeström and his colleagues, it becomes increasingly relevant to understand the realities of teaching, in which multiple parallel contexts "demand and afford different, complementary but also conflicting cognitive tools, rules, and patterns of social interaction" (Engeström et al., 1995:319). However, previous research indicates that teachers mostly tend to think of ICT as a specialist subject with its own specific content and pedagogic realms, which often are not compatible with the cultures which have developed around school subjects (Loveless, 2003); therefore, the integration of ICT into subject teaching remains problematic (Aldunate & Nussbaum, 2013). Additionally, it would be unreasonable to expect that subject teachers of various disciplines trained to teach their own subject are able to teach ICT knowledge and skills in a holistic and coherent way (Lin, 2008; Selwyn, 2011). Previous studies (e.g. Grivins, 2012) have shown that there is a lot of confusion around the matter of blending ICT skills in subject curricula due to a lack of formal guidelines on how to integrate components of two disciplines, and a lack of teaching methodologies and proper training. These aspects all restrict technology use even among teachers with positive attitudes towards ICT (ibid.)

Another issue related to neoliberal thinking is control over the results of the educational process. One of the areas of control is students' achievement. Controlling mechanisms, such as frequent tests, the monitoring of students` progress and the strong emphasis on students` success on graduation exams have been introduced in educational systems worldwide. This is a question of how we understand teacher accountability, because students` achievement is often perceived as a direct result of teachers` work (Kelchtermans, 2005). Most tests require the demonstration of the ability to solve certain tasks, problems etc. The problematic issue here is "ability demonstration": proving what you can do instead of demonstrating what you know. It would be pointless to claim that a student can prove ability without any knowledge; however, examination systems trigger practices of teaching to the test and the alignment of student abilities to systematised, standardised and centrally controlled standards (Apple & Jungck, 1990). In fact, two opposite processes happen simultaneously (Apple, 2001): 1) the growth of school autonomy and decentralisation in terms of resource management, teachers' choices of instructional methods and approaches, and 2) recentralisation in the form of externally set tight standards and accountability rules regarding the output of the teaching process.

Kelchtermans (2005) points out that external evaluation systems trigger high levels of vulnerability in teacher work, because obviously teachers can only to a very limited degree prove their effectiveness through students` achievement: we have to realise that student outcomes are only partially determined by the quality of teachers` work. That is why the quality control systems based on student test scores are felt to be unfair by many teachers (Erss, 2015).

Technology usage is seen as fitting perfectly into contemporary models of education which distinguish between the outmoded teacher-centred approaches, and the student-centred teaching deemed suitable to the needs of 21st century learners. Such models value active participation of students in the classroom process, self-directed knowledge construction instead of knowledge transfer/ conveying from teacher to students (Laurillard, 2008). In such models, the teacher is seen as a facilitator or guide who helps students to develop knowledge through methods which are based on experiential, authentic tasks, thus creating an environment in which students acquire knowledge that makes sense to them (Cuban, 1993). ICT is seen as playing a particular role in such pedagogic models. Firstly, ICT is believed to facilitate greater student autonomy, as well as promote active involvement of students in learning (Kimber, Pillay & Richards, 2002). Secondly, technology is seen as a perfect tool for inquiry, discovery and creative expression, which are aspects in line with the theories of constructivist learning, among which the Vygotskian notion of authentic learning probably is one of the most prominent and pervasive (Luckin, 2010).

Finally, we have to acknowledge that digital media have become central in popular culture, especially among young people. Therefore, it is argued that traditional "chalk and talk" methods do not suit the needs of 21st century learners, who have been labelled the "digital generation" (Papert, 1996), "digital natives" (Prenski, 2001) or "generation C" (Bruns, 2006), all pointing to extensive use of digital media by young people. Some (e.g. Prenski, 2001) have gone even further, arguing that young people, compared to their parents and teachers, share and process information fundamentally differently. Such claims should be treated with caution. As the study of Siibak (2009) demonstrated, young Estonians engage in online practices which cannot be considered revolutionary. Quite the contrary, to a large extent young Estonians were found to be "repurposing the values, structures and norms familiar from the older media in order to reuse them in the new online *field*" (Siibak, 2009:53, italics in the original). Lukas Blinka (2013) also warned against too optimistic views of youngsters and their technology use: his study revealed the dark side of excessive reliance on digital media, and its connections with psychological distress. Unfortunately, age-related thinking about the use of digital technologies (Stikane & Usca, 2015), as my own personal conversations with teachers and school headmasters indicate, is widely popular. Thus schools are seen as needing to hastily fill in the gap between traditional ways of information conveying and the ways school children are believed to be accustomed to communicate, read and socialise nowadays (Selwyn, 2011).

This brief summary of a few selected aspects of the broader context highlights the complexity of the issue of technology integration in teacher work, and raises the question of how we position teacher in the light of these macro level changes and the subsequent shifts in educational policies. Do we see teachers as conveyors of externally formulated rules and norms and initiatives filled with praise for the benefits of ICT, or as main stakeholders in the technology integration process? It is acknowledged that teachers are rarely involved in designing educational changes, which happen at the system level; however, their reactions to changes and involvement are crucial determinants of the success of changes (Ketellar et al., 2012). As has been argued previously, the more teachers feel pressured from "above", being held responsible for students' performance, the more controlling, critical, directive and less creative they become compared to their colleagues who do not experience such pressures (Flink, Boggiano & Barret, 1990; Pelletier, Séguin-Lévesque & Legault, 2002). In 2001 Boody stated that "technology is happening in the society and schools. We cannot avoid being part of it" (p.19). But we need to understand that the introduction of technology offers certain opportunities that interact with already existing cultural and individual attributes. The next chapter briefly covers the process of technology integration in Latvian and Estonian schools since 1991.

2.2. Context for technology integration in teaching in Latvia and Estonia

Technology integration in schools in Latvia and Estonia can be best understood as part of the major changes and transformations at the societal level that both countries experienced after the collapse of the Soviet Union in 1991. The main goals and strivings at the policy level in Latvia and Estonia for several decades have been connected to the idea of (re)integration into the West (Runnel, 2009): becoming member states of the European Union and NATO, and joining the Euro zone. Runnel, Pruulmann-Vengerfeldt and Reinsalu (2009) note that, due to this, ICT has been seen as a tool that helps in the process of "catching up" with the West economically and culturally, showing a belief in the transformative power of ICT (Pruulmann-Vengerfeldt, 2006). Hence, during the nineties the idea of the ICT as one of the key factors for fast development was quickly adopted and elaborated in various policy documents, including in the field of education. Estonia, in particular, has gained the image of a country making cutting-edge progress in introducing digital solutions in almost all public services: health care, voting, banking, education, citizen registration and others. Presently, Estonia is considered to be one of the most technologically advanced societies in the world (European Commission, 2016).

In Estonia, after regaining independence a new education law was enacted in 1992, and one year later a new law on basic school and general secondary school was passed (Loogma, Tafel-Viia & Ümarik, 2013). The main emphasis in the new curriculum was on education as a tool for the development of

democracy and the market economy. For teachers, this meant the long desired freedom to choose teaching methods and to design their teaching more independently (Loogma et al., 2013). The process of "internetisation" in Estonian schools accelerated in the late nineties, and was fuelled by various policy instruments which promoted quick adoption of technology (Kalmus, Pruulmann-Vengerfeldt & Siibak, 2008). One of the well-known symbols of the Estonian "internetisation" process was the Tiger Leap programme, which was launched in 1997 to adjust the country's education system to the needs of the information society. This happened by equipping schools with digital technology, connecting them to the Internet and training teachers in ICT skills (Runnel et al., 2009). In a few years, around 10,900 teachers out of 17,000 working in Estonian schools at that time took the ICT skills training courses offered by the Tiger Leap programme (UNDP, 2003). Since then Estonia has striven for a general education curriculum that focuses on the integration of ICT in the development of modern teaching methods. The focus has shifted to the implementation of general skills and knowledge in an integrated way, in which ICT is not taught as a separate subject, but blended into all subject teaching (Mägi, 2006). At the present moment, in Estonia and Latvia the national curricula define digital competences among other core competences (Latvian Ministry of Education and Science, 2013; Estonian Ministry of Education and Research, 2011).

The recent effort to modernise the Estonian educational system is concerned with the provision of various e-learning opportunities, the development of online content services, the elaboration of study programmes and teacher training in ICT application in teaching, and the use of Web 2.0 features (Empirica, 2014). Structural changes have been introduced as well, related to the application of neo-liberal principles, resulting in increased state regulation covering the results of teacher work and quality of education (Loogma et al., 2013). State control includes various accountability measures, such as assessment and testing policies, among them the state examination system, which in Estonia was established in 1997. Graduating from basic school in Estonia requires passing three exams: one in the Estonian language or Estonian as a second language, one in mathematics and an exam on a subject of the student's choice. Graduating from secondary school requires passing the state exams, consisting of the Estonian language or Estonian as a second language (for Russian-speaking schools), mathematics and a foreign language of the student's choice. Additionally students have to pass an upper secondary school examination and do a research paper or a practical work (Estonian Ministry of Education and Research, 2016). It is important to note that the national examination at the basic and secondary levels in Estonia can be considered a high-stakes testing system (Madaus, 1988), because the test scores are published and available to everybody, thus "holding schools, teachers and students accountable to the public and creating the basis for the public image of schools" (Loogma, et al., 2013:122). Many parents now strive to secure study places for their children in the "best performing schools" (ibid.). Erss (2015) points out

the paradox that Estonian teachers feel relatively autonomous in making decisions about teaching methods, tools and design of their courses. Teachers enjoy a great degree of freedom inside classrooms, while the results of their work are heavily supervised and controlled by school principals, the Ministry of Education, educational quality assurance authorities, and others in the hierarchy of power (ibid.). The TALIS 2008 study (OECD, 2009) indicated that the increase in state control over teacher work in Estonia in the last couple of decades had considerably reduced teachers' feeling of autonomy, and had gradually shifted power from teachers to state institutions, policy makers and parents.

In terms of school digitalisation policies in Latvia, the government in 1997 launched an initiative called the "Latvian Education Informatization System" (LIIS), with the goal of developing an information society in Latvia (Bicevskis et al., 2004). The establishment of this initiative was a part of the Latvian National Informatics Program, which was started one year earlier, and aimed to reach goals rather similar to the Estonian Tiger Leap programme. Among the main activities of the LIIS project was the development and modernisation of education content, management, infrastructure and user training. By the end of 2002 about 22,300 teachers in Latvia had undergone training tied to the content of the European Computer Driving Licence (ECDL) curriculum (Bicevskis et al., 2004). Recently, a large proportion of the in-service training for teachers has contained some technological aspects (European Commission, 2015), because, similar to Estonia, Latvia has set the goal of making the promotion of digital skills a part of every school subject (Kangro & Kangro, 2004). Among other aims promoting more intense use of ICT in every subject, recently a new policy initiative has been launched in Latvia: the new competency-based Framework Curriculum for general education is being piloted in 100 schools in Latvia in the academic year 2016–2017 (European Commission, 2016). The plan is to introduce the new curriculum gradually in all secondary education institutions. However, it has not yet been determined how this new curriculum will become compatible with the existing discipline-based external examination system (OECD, 2016), which dates back to 1997, when the first centrally administered and marked exam in English was organised, which soon after was followed by centralised exams in other subjects (Valsts izglītības satura centrs, 2013).

Table 2.1. The system of centralised examinations in Latvia at the upper secondary level (Valsts izglītības satura centrs, 2013).

Centralised examinations (compulsory)	Centralised examinations (elective)	Centrally set examinations, but administered and marked by schools
Latvian, Mathematics and Foreign languages: English, German, French or Russian	History of Latvian and World History, Chemistry, Biology and Physics	Informatics, Geography, Economics, and Russian language and literature in minority schools

As Table 2.1. indicates, the examination system in Latvia at the upper secondary level, differs slightly from the examination system in Estonia. In Latvia, students have to pass compulsory examinations in the Latvian language, mathematics and a foreign language of the student's choice, but then students can choose to take exams in several elective subjects (Valsts izglītības satura centrs, 2013). Latvian students at the upper secondary level can get involved in research voluntarily (there is an annual research project contest); however, it is not a compulsory activity, as it is in Estonia. All compulsory examinations in Latvia are centrally marked, and information about the scores of all students are collected and published centrally. The graduation exams in the secondary education system of Latvia, similar to in Estonia, can be considered a high-stakes testing system: since 2004, university entrance has been based on the results of centrally marked examinations. Based on their scores, prospective students compete for state budget-funded study places offered at state and a few private higher education institutions (Valsts izglītības satura centrs, 2013).

Besides the establishment of controlling and accountability systems for teacher work in Estonia and Latvia, another issue related to teacher agency is the attempt to exercise discursive power (Layder, 1997) through defining what it means to be a "good" teacher and what "good" quality, modern teaching is. Similar to in many other countries (see Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012), in Latvia and Estonia schools now often are blamed by policy makers for failing to adapt quickly enough to the rapid changes in the society. In the Estonian Lifelong Learning Strategy 2020, one can find a description of a "modern" teacher:

> "a teacher in the 21st century is not a source of information. Rather, a teacher is a person who creates connections and shapes value judgements, whose task is to develop critical and creative thinking in the student, as well as analytical and entrepreneurial skills, teamwork skills and written and oral communication skills. The teacher's role is to support students' path towards becoming learners who can manage learning on their own (…)," (Estonian Ministry of Education and Research, 2014).

Similar wording has been used in the Latvian Guidelines for Education Development Strategy 2014–2020 (Izglītības attīstības pamatnostādnes, 2013). This document emphasises that by 2020 teachers in Latvia "are to integrate digital teaching/learning resources in their practices", and "general education has to promote creative thinking and problem solving; the task of teachers is to stimulate individuality and the development of talents" (my translation). These two planning documents largely delineate the desired shift in education towards the imagined standards of the knowledge society and reflect the envisioned related changes in teachers' thinking and practice inspired by neoliberally orientated thinking, as described above. This means that, besides such procedural pressures as state examination systems, teachers are "charged with caring for the young and for upholding a series of moral standards in relation to their

roles" (Saul, 2016:159–160). This, perhaps, makes teachers more regulated and disciplined than their students, and leads to certain consequences. As Loogma, Kesküla, and Roosipõld (2010) found, the external demands "to change" cause a growing conflict between personal values and societal expectations among Estonian teachers, leading to professional dissatisfaction and the feeling of alienation from the profession.

III METHODS

Considering the overall exploratory nature of my doctoral study, in data collection and analysis predominantly use was made of qualitative approaches. In all of the individual Studies, the aim was to critically examine and conceptualise particular personal, situational, social and contextual aspects related to the pedagogic use of ICT and the dynamic relationships between them. Hence, instead of a representative sample, my doctoral study was based on two relatively small samples consisting of secondary school teachers from Estonia and Latvia. Below an overview is provided of the data collection process in each country, and a description of the samples and the underlying assumptions guiding the data analysis. The limitations of the study related to sample size and methods of data collection are discussed.

3.1. Data collection in Estonia

In Estonia, data collection happened in 2011–2012 with the financial support of the Tiger Leap Foundation under the project "Effect of teachers' ICT use activity on pupils' knowledgeable use of technology". In the data collection and analysis under this project, my supervisors, but not me, were involved, together with a group of researchers from the University of Tartu[3]. This is the reason why in writing Study I my role was to develop the theoretical frame, but I did not participate in the data analysis or the writing of the discussion. To form the data set in Estonia, data collection happened in three steps: 1) in-class observations, 2) short semi-structured interviews with teachers immediately after class, and 3) longer semi-structured interviews with teachers six to eight months later. The interview records and the researchers' field notes from the class observation sessions were transcribed and used in data analysis. The details related to the selection of the study participants in Estonia are explained in Study I.

3.2. Data collection in Latvia

Data collection in Latvia happened in the course of a small-scale action research project, which was developed in a regional school aiming to diversify the practices of ICT use of different subject teachers. The project was designed keeping in mind the fact that action research is a potent methodology for educational reform research due to its core principle of combining action with research, giving "the teachers, who carry it out, a means to develop agency to bring about change" (Somekh & Zeichner, 2009: 19). As McCutcheon and Jung

[3] The research team includes Kadri Ugur, Andra Siibak, Anu Masso, Maria Murumaa-Mengel, Piret Luik and the project leader, Pille Pruulmann-Vengerfeldt.

argue (1990:148): "[action research is] systematic inquiry that is collective, collaborative, self-reflective, critical, and undertaken by the participants of the inquiry. The goals of such research are the understanding of practice and articulation of a rationale or philosophy of practice in order to improve practice". Action research projects typically are designed and carried out in several consecutive cycles of research, reflection and action (Reason & Bradbury, 2013), although the approaches differ slightly (Herr & Anderson, 2005). This particular study was based mostly on the philosophical underpinnings of co-operative inquiry (Reason & McArdle, 2004). In brief, a co-operative inquiry group consists of people who share a common concern for developing understanding and practice in a specific area (Heron & Reason, 2001). During the study, they cycle between action and reflection, framing research questions, deciding about the methods to be employed, drawing conclusions from the experience they have accumulated together and formulating goals for the next research cycle. In the action phases, participants in educational inquiry experiment with new practices, and in the reflection phases they reflect on their experiences and plan the next steps of action (Heron & Reason, 2001).

I participated in this project as an external researcher who never really got "into the group", instead being engaged with the group in various ways suggested by McArdle (2013). My role was to help to understand the actual "status quo" of skills, beliefs and attitudes related to technology among different subject teachers. Based on these findings, the next cycles of the project were planned. I was in contact with the school for about 12 months and then my involvement with the school stopped. In the present doctoral study (Studies II-V), use is made of parts of the data that were collected during this first stage of the project. The empirical data consist of 16 semi-structured interviews with subject teachers that were conducted in Spring 2013. The interview questions covered such topics as teachers' attitudes, beliefs, opinions and experiences with ICT use, preferred methods and digital tools, training that teachers had had on ICT, perceived learning needs, motivation to use ICT in their work, and challenges with ICT use that teachers had encountered. I also asked about factors that made teachers feel successful in their work, and about their future perspectives. Then a small-scale study of teacher online search behaviour was conducted in Autumn 2013 employing several data collection methods. I used screen recording, search logs and a written evaluation form in which teachers evaluated the task difficulty before and after conducting searches, and I conducted short semi-structured interviews after teachers had completed the search tasks. I have given a detailed description of the data collection of the online search behaviour of teachers, including the list of the search questions, in Study III.

Table 3.1. provides a summary of all of the data collection methods, the number of study participants in each step of the data collection in each country, and the individual Studies in which the data are presented.

Table 3.1. Overview of the various data collection methods, participants and use of data as they appear in Studies I–V.

Data collection methods	Number of participants	Country	Studies where the data were used
Class observations and short interviews with class teachers and subject teachers	16	Estonia	Study I
Semi-structured interviews with class and subject teachers	16	Estonia	Study I; Study II* and IV*
Semi-structured interviews with subject teachers	16	Latvia	Study II, III, IV and V
Search logs, screen records from the sub-study of teacher online search behaviour	10	Latvia	Study III
Post-search interviews	10	Latvia	Study III
Written evaluation form	10	Latvia	Study III

* From the Estonian sample, in Studies II and IV only data from interviews with subject teachers were used. The interviews with Estonian class teachers were excluded from the analysis in order to make the two samples – Latvian and Estonian – compatible.

Additionally, in the course of the action research project in the Latvian school, teachers were involved in diary writing, focusing on their ICT use practices, which was followed by a focus group discussion where teachers reflected on the process and results of writing the diaries. Several focus group discussions were held for teachers to share their ICT practices and applications of ICT in different subjects. These additional data have never been reported in any academic publication; however, they helped me in writing the sub-chapter 2.2 of this introductory article about the context of ICT integration in schools.

3.3. The samples

The samples in both countries were rather heterogeneous in terms of teaching experience, the subjects taught, attitudes towards ICT and technology-related practices. The Estonian sample consisted of teachers with teaching experience ranging from three to more than 20 years. The Estonian sample consisted of 16 teachers from five different schools, including schools with Russian as a teaching language. During the data collection process, six class teachers for grades 1–3 (teaching all subjects), and five science and five humanity teachers for grades 4–9 were interviewed and their lessons were observed by the research project team. The Latvian sample consisted of seven teachers of science, and nine teachers of humanities teaching on both lower and upper secondary levels. Latvian teachers' work experience in teaching ranged from 11 to 31 years. The Latvian sample consisted only of female teachers, while in the Estonian sample all but one teacher was female. Table 3.2 provides an over–view of the subjects taught by the teachers included in our samples.

Table 3.2 Overview of the samples.

School disciplines	Number of participants: Estonia	Number of participants: Latvia	Total
Class teachers (teaching all subjects in grades 1–3)	6	0	6
Science and maths teachers (mathematics, physics, chemistry, biology and geography)	5	7	12
Humanities teachers (history, music, foreign languages, mother tongue and arts)	5	9	14

More detailed information about the process of forming the samples is provided in Studies I, II and IV. It should be noted that the limitations related to the method of selecting participants differed in each country. In Estonia the data were collected in several schools, while in Latvia all data collection activities happened in one school in the course of an action research project. This limitation was overcome by concentrating on the specifics of ICT use in teaching at the school subject level, excluding the school cultures from the analysis. The small size of the samples is another limitation of my doctoral study and, as a result, in all individual Studies an exploratory approach during the data analysis was employed with an emphasis on the fact that the findings were not readily generalisable, but were rather useful in defining questions and directions for future research (Yin, 1993). In Studies II and IV the two samples from Latvia and Estonia were treated basically as one, and the results obtained from the data analysis were reported without specifying the nationality of the study participants. Also, the protocols for the long semi-structured interviews, which formed the "backbone" of the data set employed in my doctoral study, were slightly different in the two countries. Therefore, in Studies II and IV only the overlapping blocks of themes from interview transcripts were used in data analysis. Hence, any cross-national claims were avoided. I believe this was a suitable approach considering such aspects as the similar cultural and historical backgrounds of Latvia and Estonia, and the similarities in both countries in the technology-related thinking and activities on the policy level that I described in the previous sub-chapter 2.2. The next section gives a detailed overview of the process of data analysis.

3.4. Data analysis

As can be seen from Table 3.1, the semi-structured interviews with subject teachers in Latvia and Estonia clearly formed the "backbone" of almost all of the individual Studies of this doctoral study. Therefore, during the process of data analysis, the principles of analytical pluralism (Frost & Nolas, 2011) were followed. This approach was applied to extract as much meaning as possible from the empirical evidence in order to explore the multiple dimensions of teacher agency in relation to ICT integration in teaching without being limited

to a single perspective (Coyle, 2010). It included the use of several qualitative analytical methods, and several theoretical frameworks suggested by Frost and Nolas (2011). Analytical pluralism relies on the assumption that "a data set can tell us about a number of different things, depending on the questions we ask of it" (Willig 2013:19). The merit of analytical pluralism is that it acknowledges the use of diverse methods of analysis and production of different forms of knowledge from a single data set as complementary, rather than mutually exclusive. As Frost and Nolas (2011) argue, each analysis can reveal a different aspect of the phenomenon of interest. Thus, it is possible to enrich our understanding of the plurality and complexity of the social world and human experience (Coyle, 2010). The most common problems of analytical pluralism arise from the application of disparate or sometimes dissonant approaches and differences in philosophical underpinnings of methodologies (Willig, 2013). In order to overcome such problems, the social domain theory (Layder, 1997), although not employed directly in any of the individual Studies, served as a "research map" (Layder, 1993:8) through the different stages of data analysis, and made it possible to reveal the interrelatedness of various factors stemming from various domains. Table 3.3 gives an overview of the factors stemming from the four social domains, and their relations, as they were examined in the individual Studies I–V.

Table 3.3 Overview of the various factors stemming from the four social domains (Layder, 1997) covered in the individual Studies.

Study	Psycho-biography	Situated activity	Social setting	Contextual resources
I		Instructional style; teacher-student-technology interaction	Subject cultures	
II	Teacher beliefs about the nature of technology and the nature of learning; self-efficacy beliefs	Mediation of students' use of digital technology	Subject cultures	
III	Self-efficacy beliefs	Practices of information retrieval online; teacher-technology interaction		
IV	Achievement goal orientation; teachers as learners about ICT			Curricular requirements; high-stakes exam factor
V	Teacher beliefs about the nature of technology	Promotion of students' digital skills	Subject cultures	Curricular requirements; high-stakes exam factor

As Table3.3 indicates, the empirical data analysis in the individual Studies applied concepts from psychology (e.g. self-efficacy beliefs – Study II and III; professional achievement goals – Study IV), communication studies (e.g.

teachers as mediation agents for student use of digital technology - Study II), and pedagogy (e.g. teaching approaches such as instructional styles – Study I). The list of the particular theoretical concepts and the methods of data coding emerged during the extensive and intensive literature studies which I carried out from the very start of my doctoral studies, combining them with frequent discussions with my two PhD supervisors, and constant reviewing of the empirical data. Thus, on one hand, it was an iterative, flexible, partly "theory-driven" and partly "data-driven" exercise, since new concepts and theoretical frameworks were arrived at. Table 3.3 is an illustration of the process in which my understanding of the multifaceted nature of teacher work and experience with ICT evolved. The various theoretical frameworks were not applied with the goal of capturing the entire reality around teacher practices of ICT use. That would be beyond the scope of any dissertation. Rather, the aim was to focus attention on the multidimensionality and variety of factors influencing teacher agency in relation to pedagogic use of ICT. The approach of reporting findings from each round of analysis separately ensured that the boundaries between different analytical frames were made clear, and that conceptual clarity on the level of individual Studies was maintained as suggested by Kincheloe (2001).

The methodology of data analysis used in my doctoral study was mainly qualitative. The main data analysis methods applied were qualitative thematic analysis (Braun & Clarke, 2006) and a variation of constructivist grounded theory (Charmaz, 2014). The inductive approach (Patton, 2002) was applied in Studies I, II, III and V for the initial data coding, which started with open coding (Straus & Corbin, 1998), followed by splitting the transcript material and identifying text segments which contained "meaning units" (Thomas, 2006:241). According to the research questions and the domains that were examined in each individual Study, attention was paid to particular excerpts from the interview material. The initial coding was followed by a close reading and development of labels for codes that later were grouped to form broader categories. Axial coding was applied to clarify relationships between the various categories and the various domains in order to ensure the internal coherence, consistency and distinctiveness of the codes (Braun & Clarke, 2006). Although the main principle in the data analysis was reliance on inductive categories as they were derived from the raw data, in some cases combinations of inductive and deductive categories were used.

In Study I, the analysis concentrated on the parts of the teacher interviews dealing with teacher instructional styles, home assignments and the links between subject cultures (Goodson & Mangan, 1995) and teachers' ICT practices. The initial codes were later compared to the continuum of teacher instructional styles proposed by Zhao (2004) to trace specific articulations in teachers' speech.

In Study II, the factors stemming from three social domains were examined: the domain of psychobiography (teacher beliefs about the nature of technology, learning and self-efficacy beliefs), the domain of situated activity (mediation activities of students' use of digital technology) and the domain of social setting

(subject cultures). During the early stages of data coding the initial codes were developed, such as teacher beliefs about technology as something good for teaching and beliefs about ICT as bad or threatening for teaching; a continuum was developed indicating high, medium and low teacher technological self-efficacy. A distinction was made between science and humanities teachers through open coding of interview excerpts, focusing on the differences in teachers' ICT-related attitudes, beliefs and practices. The initial codes that we developed in the domain of situated activity (mediation of students' use of digital technology) were later compared to the general framework of mediation roles developed by Kalmus (2013). The categories proposed by Kalmus (2013) – gatekeepers, guides/coaches, "windows" and counsellors/trustees – were applied to label the mediation strategies of teachers, and to develop the descriptions of mediation activities under each strategy. In practice, this meant moving back and forth between data and analysis, using a comparative approach to extract, code and list the main findings according to the focus of the study.

Frost and Nolas (2011) suggest that analytical pluralism involves the use of multiple data sources to enrich our understanding of a particular phenomenon. Following this assumption, in Study III use was made of the semi-structured interview material which I collected in the secondary school in Latvia, and additionally I conducted a mini-study on teacher online search behaviour. For this sub-study, 10 participants were selected by applying the purposive sampling method (Palys, 2008) from the initial sample, which consisted of 16 teachers (see Table 3.2). I selected participants who represented different disciplines, varying work experience at school, and various levels of technology-related self-efficacy beliefs. The aim here was to compare teacher-perceived technological self-efficacy (the domain of psychobiography) with their actual technological skills, which were conceptualised as teacher-technology interaction, and allocated to the situated activity domain. In designing this sub-study, I was largely guided by the results of previous research indicating that perceived self-efficacy among adults can be rather misleading, because people tend to over- or under-estimate their technology skills (see, e.g., Albion, 2007). In Study III, in addition to open coding of the interview material, which helped to clarify the self-efficacy levels of the involved teachers' satisfaction with previous online search experience, use was made of statistical methods to calculate a range of parameters in the body of quantitative data. The quantitative data were collected through screen recordings, transaction logs and a short written evaluation form that teachers filled in before and after they did the search tasks. Spearman Rank Correlation was used to calculate the relationship between such parameters as the number of keywords used, the total number of queries, the number of web-pages opened etc. The Wilcoxon Signed Rank Test was run to determine the statistical difference in rates of the task difficulty before and after searches (more complete information about the data analysis can be found in Study III).

In Study IV, a combination of inductive and deductive approaches to data analysis was applied. The already existing framework of teachers' achievement

goals developed by Butler (2007, 2012) and the findings of previous studies were made use of in order to analyse the achievement motivation of the teachers. Then, two other aspects of interest in this Study - teachers' ICT practices, and the motivation to adopt new ICT-related skills and knowledge – were coded in an iterative way. The initial coding was carried out in order to split the interview material into smaller units of analysis, and then attention was paid to the particular excerpts which reflected the patterns in teachers' speech related to the three themes mentioned above. Regarding the first, teachers' utterances were compared to the items that were used in previous surveys of teacher achievement motivation (Butler, 2007, 2012) and other literature sources in order to identify matching themes indicating the five types of teacher achievement goals: mastery, ability-approach, ability-avoidance, work-avoidance and relational goals. The differences in teachers' achievement goal structures and their relation to the other two aspects were examined: ICT practices and motivation to learn about ICT. Since there was significant ambiguity in the data, several discussions were held between me and the co-author Pille Pruulmann-Vengerlfeldt, who was involved in the data analysis, to finalise the coding process. Through our discussions, we came to the conclusion that some teachers were not pursuing a single achievement goal but a combination of two goals in their work.

In Study V, an inductive approach was applied to analyse two semi-structured interviews with different subject teachers, paying attention to significant themes related to the ways in which subject teachers can promote students' digital skills. The initial codes that emerged from the data were structured under four themes: 1) digital competences that teachers try to enhance, 2) teaching approaches which support the integration of digital competences in subject teaching, 3) teachers' reasoning about their motivation to integrate the promotion of digital competences in their teaching, and 4) the representation of subject cultures and wider contextual aspects in teachers' speech in relation to digital skills' promotion.

For the purposes of this introductory article, a systematic qualitative meta-analysis (Timulak, 2009) of the findings of Studies I–V was performed in order to create a new typology of teacher agency manifestations in relation to ICT integration in teaching. My aim in creating the typology was to highlight the variety of ways in which teachers navigate within the influences of various factors stemming from the four social domains proposed by Layder (1997). The theory of social domains served as a theoretical framework for the meta-analysis, with the only modification being that I coded separately the iterational dimension (past) and the projective dimension (future) of the psychobiographical domain, following the assumption that future aspirations are very much related to the learning motivation of teachers as part of the achievement of desired identity (Priestley et al., 2011). The meta-analysis included multiple close readings of the initial findings and their interpretations, the identification of dominant and significant themes and the creation of a coding scheme (see Table 3.4). The dominant themes which emerged from the initial findings I

categorised in three dimensions: teachers as ICT users, teachers as mediators of students' use of technology, and teachers as learners and adopters of new ICT-related knowledge.

Table 3.4 The coding table for the meta-analysis of the findings of the individual Studies.

Domain / Dimensions of agency	***Psychobiography-iterational dimension***	***Psycho-biography-future aspirations***	***Situated activity***	***Social setting***	***Contextual resources***
Teachers as ICT users	Self-efficacy beliefs; beliefs about learning; beliefs about the nature of technology	Achievement goals	Teacher-technology interaction	Subject cultures	Curricular requirements; high-stakes exam factor
Teachers as mediators	Beliefs about learning; beliefs about the nature of technology; self-efficacy beliefs	Achievement goals	Instructional styles; teachers as mediators of students' use of ICT	Subject cultures	Curricular requirements; high-stakes exam factor
Teachers as learners about ICT	Self-efficacy beliefs	Achievement goals	Instructional styles; teachers as mediators of students' use of ICT	Subject cultures	Curricular requirements; high-stakes exam factor

The meta-analytical analysis was aimed at condensing the many and varied findings from separate Studies in a brief summary format, at linking together the findings of the individual Studies and making connections between them, and finally at developing labels for the various forms of teacher agency manifestations as they derived from the results of the individual Studies. The application of Layder's framework of four social domains helped to maintain the focus on all aspects of social life, which was needed for such an analysis.

In terms of ethical considerations, throughout my doctoral study the general principles of the involvement of human subjects in research were followed as expressed in the Belmont Report (Department of Health, Education and Welfare, 1979). The study participants were involved in the study on a voluntary basis. Before the data collection started, the teachers gave informed consent to being interviewed and observed and to participate in the on-line search study. Additionally, the anonymity of participants was ensured by never mentioning teachers' names in the individual Studies, instead referring to them as teachers of particular school subjects. The names of the participant schools were not revealed.

IV EMPIRICAL FINDINGS

The empirical findings are introduced in five sub-chapters, based on the research questions and sub-questions posed in the Introduction. The first four sub-chapters deal with the first research question: How are the influences of various social domains related to technology integration in teaching? The results are presented through the four sub-questions, focusing on the influences of four domains of social life, starting from psychobiography, and moving on to situated activity, social setting and contextual resources. The last sub-chapter of the empirical findings' section provides answers to the second research question: How is teacher agency in technology integration manifested when teachers navigate within the network of various personal, situational and social influences related to technology integration in teaching? To answer the second question, a meta-analysis of the empirical findings presented in the individual Studies was carried out and, as a result, I proposed a new typology of teacher agency manifestations.

4.1. Domain of psychobiography

The domain of psychobiography, according to Layder (1997), contains both historical and future/projective dimensions. In the following two sub-chapters, I present the findings related to the historical, iterative dimension separately from the findings related to the future-oriented dimension of this domain.

4.1.1. The historical dimension of the domain of psychobiography

The historical dimension – teachers' beliefs – was explored in Study II, III and V. The richest variety appeared in teacher beliefs in relation to the application of different ICT tools in teaching: beliefs about the nature of technology, beliefs about the nature of learning, and teacher self-efficacy beliefs (Study II). Regarding the nature of technology, two distinct types of beliefs emerged: about technology as something good for teaching, and about technology as something bad or threatening. I will start with the beliefs about ICT as something "good". As Table 4.1 indicates, in teachers' opinions, digital tools were mainly good because they made the classroom process more interesting, released teachers' from doing some tasks and brought variety to classroom work.

Table 4.1 Summary of teacher beliefs about technology as something beneficial for their practice.

Technology is good for my teaching, because it:	**Tools and practices of ICT use**
Helps to explain complicated topics through visualisation and demonstration	Demonstration tools, such as PowerPoint, videos and visuals
Helps to save the teacher's time in marking and grading student work, because students can do various drill-and-practice tasks online	Various drill-and-practice tools employed
Provides some relaxation and fun after the "serious" learning is over	Videos and short films
Is good for collecting and storing learning materials	Keeping a blog or other digital platform where students can access different exercises and practice on their own between lessons and at home
Brings variety to classroom work	Use of different multimedia content; students independently do tasks online
Allows students to learn independently, and promotes group interaction	Project based learning: research online and data collection
Helps to promote student creativity	Cameras, software for video editing, blog platforms and collaborative documents

As Study II indicated, a majority of teachers valued ICT because it helped to maintain existing practice, although a small group of teachers also saw the value of technology in promoting students' research, collaboration skills and creativity.

In terms of beliefs where technology was pictured as something bad, seven distinct themes emerged in teachers' speech. Table 4.2 summarises teachers' negative beliefs about technology.

As Table 4.2 indicates, the main beliefs regarding the "badness" of ICT were related to issues of ensuring the progress of all students in the group, maintaining the pace of the learning process in the classroom, and maintaining the hierarchical relationship between the teacher and students.

Another type of teacher beliefs that was explored in Study II was beliefs about the nature of learning. Here several themes emerged related to the aims, the process and the sources of learning. One group of teachers believed that students learned in order to get good grades. For them ICT seemed suitable as a tool for teaching to the test and to help students to acquire knowledge which the teacher knew would be evaluated in the exam. A different view was that learning meant discovery and, in the words of one of the teachers, "understanding of 'how things work'". A few teachers made a distinction between learning from books and with computers, and the first option, in their opinion, seemed to be more valuable, because books provide "classic knowledge", i.e. the foundations of disciplines. The teachers seemed to neglect technology because they believed that learning could happen only in close interaction between the teacher and students. In the teachers' opinion, computers and

inappropriate uses brought distraction to the classroom process. The teachers expressed different opinions on the issue of whether subject learning should be combined with improvement in digital skills. Several Latvian teachers emphasised that Informatics still existed as a separate subject, and therefore other subject teachers should not deal with the promotion of students' digital skills, while there were a few teachers who noted the opposite and, as our data revealed, they actually spent a lot of time helping students to learn and use different hardware and software. I have analysed this practice in detail from the perspective of subject boundary crossing in Study V.

Table 4.2 Teacher beliefs related to the "bad" nature of technology (Study II).

Technology is bad for my teaching, because:	**Related tools and practices of ICT use**
It does not suit "serious" learning; it actually can distract students from understanding the topic	ICT used at the very end of the lesson for a few minutes to show some videos
The computer class is a non-functional space	You can do only computer-related activities there; it requires extra effort to plan and carry out; much assistance is needed for students.
It slows down the classroom process; students start playing with technology and lose attention	Limited availability of computers occasionally; students are only allowed to do tasks with the computers under strict supervision,
It does not suit the learning needs of low-performing students	The best performing students are sent to computer lab to do tasks on their own, while the teacher works in the class with the other students
It causes a loss of discipline and lowers the authority of the teacher	Use of ICT in very limited amounts, always under strict control (the teacher gives very limited time to do the task, and provides detailed work-sheets)
It is unreliable: the computer can shut down unexpectedly, the Internet connection can get disrupted, or the needed web-page might suddenly close	Always have a plan "B" in case something goes wrong with the ICT tool
The Internet is a "time eater" for teachers and for students, too much time is spent on searching, and at the end you find nothing	Sticking to the selection of web-pages which are considered useful

It was evident that the teachers' opinions on whether their responsibility was to promote students' digital skills was related to their perceived technological self-efficacy and confidence in using ICT. Teacher self-efficacy was explored in Studies II and III. As Study II indicated, teachers tended to evaluate their ICT competence by comparing it to others: either their students or other teachers. For some teachers, this was the reason why they believed that their skills were low: they tended to be impressed by the technical abilities of their students or some role model among their colleagues, and therefore they did not value their own skills (Study II).

The individual articles also examine the possible relationship between teacher self-efficacy and several factors, such as their work experience and actual search performance. No link was found between teachers' experience at school and their computer self-efficacy (Study II): teachers who reported high self-perceived ICT competence were found among those with few years in teaching profession and also among veteran teachers with more than 30 years of work experience. In Study III teacher self-efficacy was compared to the ability to evaluate how difficult it was to find answers to various questions by searching on the Internet. As the results showed, even teachers with high self-efficacy tended to overestimate the difficulty of the search task; after completing searches, all teachers changed their opinions about the task difficulty. This study also demonstrated that, independent of their self-efficacy levels, all teachers applied the same information search strategy online. None of the study participants found answers to all of the questions in spite of the fact that teachers were given unlimited time to complete the tasks. None of them made use of Bolean operators or any other limiters to narrow the search and probably find the correct answer. Low self-efficacy beliefs were related to dissatisfaction with the online search experience and inability to choose the right key words (Study III). Teachers with medium and high levels of self-efficacy seemed to be more satisfied with their search experience, although, as the actual search results revealed, most of them relied on the trial-and-error method, which, according to the literature is not characteristic of advanced information searchers online (Haglund & Olson, 2008).

4.1.2. The projective dimension of the domain of psychobiography

The projective, future-orientated dimension of the psychobiographical domain was addressed in Study IV, which focused on teacher achievement goal orientation and motivation to learn about ICT. This article indicated that each achievement goal type (Butler, 2007, 2012) is related to distinct practices of ICT use and triggers different motivations to improve skills in digital technology use. Teachers with mastery motivation seemed to be the most willing to learn and acquire new knowledge about ICT. Learning and experimenting with new ICT tools and resources, in their opinion, was also an opportunity to escape professional burnout. Teachers with the ability-approach wanted to acquire some special knowledge which not all teachers might have, e.g. making videos. Teachers with the work-avoidance achievement motivation wanted opportunities for ready-material exchange and training on how to perform better searches online. The relational goal motivation appeared to be highly represented in our samples, and teachers who strove to pursue close and warm relationships with their students turned out to be the least interested in improving their ICT skills due to their belief that technology, as "something cold and unfriendly", would stand between them and their students (Study IV). As

Studies I and III indicated, teachers seemed to be active participants in various training and life-long learning programmes; however, the interview analysis revealed that these trainings provided teachers with practical skills for using some particular technological tool (e.g. the Interactive whiteboard) rather than broadening their repertoires of instruction. It can be assumed that as a result teachers might adopt knowledge which fit into their already existing instructional styles.

4.2. Domain of situated activity

The domain of situated activity deals with the interaction between teachers and students, and two aspects were examined in the individual Studies: the mediation of students' use of digital technology (Study II) and the promotion of students' digital skills (Study V).

Study II focused on the mediation practices of teachers, asking questions about the roles of teachers in young people's usage of digital technology. This study revealed that the teachers mainly acted as gate-keepers, guides and "windows" (Kalmus, 2013). Table 4.3 provides an overview of how the mediation styles were linked to particular ways of applying ICT tools.

Table 4.3 Teachers' mediation roles and linked activities of ICT use (adapted from Study II)

Mediation role	**Linked activities of ICT use**
Gatekeepers: social and technical restrictions, monitoring, setting rules	Rely on supervised internet access Try to protect students from seeing potentially harmful content online Limit students` opportunities to use ICT based on teachers` perceptions of students` ICT competences Require homework to be handwritten
Guides/coaches: active mediation, co-use, interpretive mediation	Teach about netiquette Teach to do searches online Teach how to use different software/hardware Aim to develop students` critical thinking skills Teach about ethics online, e.g. referencing sources Involved in discussions with students about digital opportunities Do searches online together and discuss the results
"Windows": active mediation, co-use	Teach how to produce videos Teach how to blog Teach how to use ICT for collaboration, sharing and project work

Study II also indicated that Estonian teachers saw their role as being mediators more than Latvian teachers did. One possible explanation was that the Estonian teachers worked with younger students (grades 1–9) while the Latvian teachers in our sample worked in grades 7–12. The Estonian teachers also talked about

the shifts in their mediation practices, depending on the groups they had to work with: the teachers did more mediation in groups they believed had lower ICT competence, while in student groups with advanced ICT skills the teachers tried to avoid showing possible incompetence. If the teachers felt comfortable with the class, they also used reverse mentoring (Peterson, 2012), asking students to carry out specific ICT-related tasks on the teacher's behalf (Study II).

The issues of the mediation of students' use of digital technology were also touched upon in Study I, which explored how the teachers' preferred instructional styles triggered certain approaches to technology use in the classroom. In Study I, based on classroom process observations, it was found that the teachers who preferred teacher-centred approaches relied mostly on teacher-led instruction, which involved little or no encouragement of students to use technology directly. ICT was used as a presentation tool, and in most cases merely substituted for printed materials. Teachers who relied on more student-centred approaches in teaching did so by giving more space to students to search, explore and create. All of the teachers very carefully selected the homework tasks, believing that not all students had computers and Internet connections at home (Study I). The preferred instructional style was also one of the aspects analysed in Study V, where it was illustrated by two cases in which a subject teacher, depending on the instruction style, could contribute to the improvement of very different sets of students' digital skills. In one case, the teacher supported the acquisition of digital literacy aspects related to critical thinking, independent studies, collaboration, creative expression, communication and problem solving, while the other teacher mainly dealt with students' abilities to search online, to distinguish content with educational value, and to be able to use online resources for independent practice and thus prepare for tests. Study V problematised whether subject teachers should be held accountable for the promotion of students' digital literacy. Based on the findings, a suggestion was made that subject teachers should not be viewed as the main providers of digital competences; rather, subject teachers' responsibility should be to demonstrate how the digital skills acquired in Informatics lessons could be transferred to learning in other disciplines.

As Studies I, II and V indicated, very few of the teachers used only one style of mediation or instructional approach; the teachers used various approaches and mixed them according to the situation, the task and the teaching goal. The estimated differences between teachers' own perceived technical competence and the groups' technical competences were important criteria for choosing the ICT tools used.

4.3. Domain of social setting

According to Layder (1997), social setting forms the context for situated activity, and it maintains some of its integrity after the interaction is over. In this doctoral study, school subject cultures (Goodson & Mangan, 1995) were conceptualised as the domain of social setting, and their influences on teachers' practices of ICT use were analysed.

In order to understand how subject cultures play a role in teachers' reasoning about and application of ICT, we primarily considered the excerpts from the interviews where teachers talked about different discipline-related limiting or enabling factors of ICT use.

We found that teachers used a lot of strong subject-based argumentation to explain why a particular tool, method or approach of ICT use was or was not good for teaching. Often they started a sentence with "as a teacher of (subject), I…" or contrasted their own technology usage practices to practices of other subject teachers. It was found that the teachers mainly learned about new ICT tools from same-subject teachers, and engaged in experience exchange within their subject departments (Study II). It appeared several times in the interviews that science teachers felt they should be and were more willing to integrate technologies in their practice because the teaching of these subjects was perceived as naturally linked to the application of different kinds of technological tools. Humanities teachers, especially language teachers, argued that their subjects could not really be learned without close direct interaction between the teacher and students: in their opinion, "live conversation" and writing by hand during the lessons was crucial. Therefore, the teachers, for example, accepted only hand-written essays or allowed students to do only some drill-and-practice tasks online (Study II). There were a few language teachers who emphasised that they did work with technologies more and had better skills in handling different tools than a "normal" language teacher would have. Some humanities teachers also talked about the connection between school subjects and the classrooms where they usually worked: this issue was raised in combination with complaints about the need to leave the subject classroom and go to the computer lab to do some tasks online (Study I). The teachers described it as "de-contextualisation" of the subject. Differences were noticed in technological self-efficacy levels among the science and humanities teachers: the science teachers seemed to be more confident about their ICT skills. One possible reason for such a difference in perceived self-efficacy is that humanities teachers were working with many generic resources not specifically designed for teaching purposes, whereas science teachers mainly relied on a few subject-specific educational applications and interfaces which they knew well and were accustomed to.

However, as Study I indicated, the ages of students and the grade in which a teacher works might play a role. In the Study I it was found that humanities teachers actually applied a wider spectrum of teaching approaches, while teachers of science subjects relied mainly on teacher-centred instruction, which

meant little or no time given to students to work with ICT on their own. Some science teachers appeared to be more sceptical about active use of ICT and said that they would rather use ICT once in a while, and combine it with other teaching methods, such as doing tasks on paper. But, it has to be kept in mind that in Study I data came only from a group of subject teachers in Estonia working with students in grades 4–9, and class teachers working in grades 1–4. When, for writing Studies II – V we extended the sample by including teachers from Latvia working in grades 7–12, and excluded Estonian class teachers, the differences between science and humanities teachers decreased. Science teachers who worked with older students (grades 7–12) compared to humanities teachers turned out to be more positive about the educational value of ICT. Their approaches of mediating student use of digital technology corresponded to such mediation roles as guides/coaches and "windows", while many humanities teachers in our sample relied on supervised Internet access, and students were only allowed to work with web-pages which were recommended by teachers (Study II).

4.4. Domain of contextual resources

Under the domain of contextual resources, in Studies IV and V the influence of the high-stakes examination system and national curricular requirements were analysed. Aas Studies IV and V revealed, some teacher choices of using ICT echoed considerations related to the macro-level societal drives which were described in Chapter 2.1 of this introductory article. I would argue that the centralised examination system seemed to be the most important macro-level aspect influencing teacher views and practices of ICT use. Study V was an illustration of how the need to teach the curriculum in an effective way, to speed up the learning process in order to prepare students for examinations, triggered certain choices of ICT use for the purposes of the amplification (Hughes, 2005) of the existing teaching approaches. Study V also revealed how an English as a Foreign Language teacher's strong feeling of responsibility for her students' success in exams and their future career prospects turned out to limit certain practices of ICT use, in spite of the fact that the teacher was very familiar with the pedagogic value of the application of ICT to promote student-centred teaching and learning. Similar findings were described in Study IV: we found that students` achievement on exams for several of our study participants was the main criterion for measuring teachers' pedagogic success. The use of ICT was adjusted accordingly to increase student scores on tests. Study IV also demonstrated that technology served to support the acquisition of particular subject knowledge that the teachers knew would be tested on the upcoming exam. However, as the data analysis indicated, few teachers who had to prepare students for centralised exams used ICT in ways which also stimulated students' creativity and promoted collaboration (Study V).

The individual Studies also indicate how the influence of the dominant discourse about the "modern" teacher of the 21st century is echoed in teachers' daily life through attempts to develop and maintain the image of a digital expert, e.g. to demonstrate active ICT use and consult colleagues in ICT related matters; these were techniques we found in Study IV. By some teachers ICT use was seen as a smart strategy for securing a certain status in the teacher community, impressing others and receiving acknowledgement for being a modern and "good" teacher. One interesting related theme which appeared in the interview material was: "how much do I know about ICT, compared to my colleagues?" Teachers emphasised that they had some special technological skills which other teachers did not have, or they tried to demonstrate their competence in ICT use by saying how little they benefited from most ICT-related teacher training, because everything that was said or shown they were already familiar with (Study IV).

4.5. Manifestations of teacher agency within various personal, situational, social and contextual influences

The second research question of my doctoral study is: **How is teacher agency in technology use manifested when teachers navigate between different personal, situational, social and contextual influences?** The five types of teacher agency manifestation which I constructed after having carried out a meta-analysis of the main findings presented in the individual Studies I-V are the following: enthusiastic appropriation, pragmatic assimilation, reserved balance, hampered accommodation, and sceptical ritualism.

In labelling the teacher agency manifestation types, I borrowed some terms from previous studies, e.g "appropriation" from the study of Stillman and Anderson (2015). I believe that this term best describes the richness of ICT use which I found in teachers' practices and the level of co-authoring that they demonstrated when making the ICT integration policy "their own". In a similar way, I borrowed the notion of "ritualism" from Merton's study (1957) to indicate the situation in which teachers were against computers, but used them occasionally anyway for the sake of demonstrating some ICT flavour in their teaching. In describing each type of teacher agency manifestation, I concentrated on three dimensions of teacher agency: teachers as ICT users, teachers as mediators and promoters of students' use of digital technology, and teachers as learners about ICT. At the end of the description of each type of agency manifestation, the intention of improving ICT skills and particular learning needs is identified.

Enthusiastic appropriation. Teachers in this group had acknowledged the value of ICT in implementing more student-centred and inquiry-based teaching and learning approaches. They saw the value of ICT in making their teaching experiences more enjoyable and interesting by providing opportunities to

experiment, develop and change their practice, and learn new things together with their students. As Study IV indicated, such attitudes to ICT were related to the mastery achievement goal orientation. Teachers in this group held high ICT-related self-efficacy beliefs (Study III). These teachers supported students` use of technology in various ways, and actively helped them to develop skills for using the Internet not only for information search, but for creative self-expression, thus serving as "windows" and active guides and coaches, helping students to navigate through the "digital jungle" (Study II). These teachers were the ones who were most enthusiastic about involvement in teacher professional development and attending training related to ICT. Teachers in this group felt ownership regarding educational technology. It was shown in Study V how deeply a teacher of biology integrated technology in her practice and how much self-reflexivity she put into managing the challenges that came along with technology integration, e.g. in mediating students` use of ICT, helping them to acquire advanced skills in using various hardware and software, and planning and organising the teacher's own use of digital tools. However, it has to be noted that none of the teachers in this group were teaching subjects in which students, according to Latvian and Estonian rules, have to take compulsory centralized exams.

Intention to improve ICT skills: high.

Perceived learning needs: high-level digital literacy skills, content creation, tools and methods which support student-centred and project-based learning.

Pragmatic assimilation. In this group, teachers saw the value of ICT as far as it helped them to reduce some workload related to preparation for lessons, teaching and assessing student work. As was indicated in Study IV, such attitudes indicated orientation towards a work avoidance goal. These teachers were convinced that their ICT skills were above average and, accordingly, they reported being very active and confident ICT users (Study III); however, technology was adapted by them in ways which did not make big changes in their already established, mainly teacher-centred practices. This was related to several factors, mostly to strong beliefs about the nature of learning and the nature of technology, namely the degree to which ICT tools could support learning (Study II). Some teachers held values and expressed opinions which were contradictory to the approaches they relied on in their actual teaching practice. These teachers "in theory" acknowledged the creative potential and usefulness of various ICT tools for student-centred teaching, but their choices of using digital technology in ways which supported teacher-centred learning were related to their perceived need to keep up with the curricular requirements and avoid possible risks of not preparing students sufficiently for final exams (Study IV). This was coupled with strong beliefs about students as rather passive participants in the learning process: one of the teachers said during the inter-view that students actually **wanted** teaching-from-the-front (Study II). These teachers also practised a mostly gate-keeping mediation style and applied various techniques for structuring students' use of computers during the lessons,

e.g. by preparing detailed worksheets, giving closed-end tasks, and preparing lists of "appropriate" web sites to be used by students (Studies I and IV). Such practices were based on teachers` belief that students lacked skills and therefore needed guidance to use digital resources for serious learning purposes. These teachers also emphasised that they highly valued their established expert-of-ICT-use image, which was maintained through different sets of activities: consulting colleagues on ICT-related matters, and being acknowledged as having special ICT skills (e.g. skills of filming and editing videos). Characteristic of these teachers was the ability-approach achievement goal orientation (Study IV).

Intention to improve ICT skills: high.

Perceived learning needs: resources with ready-to-use materials, and skills in using ICT in ways which would reinforce their expert-of-ICT-use image.

Reserved balance. Teachers in this group were rather cautious about the use of ICT. They had developed this attitude mainly due to their very strong relational goal orientation, which led them to the belief that technology might seriously threaten their goal of establishing and maintaining warm and close relationships with their students, which, they believed was best built on face-to-face encounters and class interaction (Study IV). However, they did not fully neglect the educational value of ICT; rather their opinion was that technology could be integrated into teachers' work in some way or other, but always with utmost caution, keeping in mind, in the words of one study participant, that "less is better than too much" in achieving the desired goal. At the same time, some participants had developed practices which they believed helped to deepen their relationships with students and decrease the hierarchy between students and themselves. These teachers asked for students' help in finding lesson materials online, help with troubleshooting etc., thus trying to demonstrate that teachers were "not always the cleverest ones in the class", as one of the teachers in the Latvian sample said. Most teachers in this group stated rather firmly that they did not want to improve their ICT skills, arguing that they were not planning to intensify or modify their technology use (Study IV). These teachers perceived their ICT usage skills and technological self-efficacy as moderate or low (Study III).

Intention to improve ICT skills: low.

Perceived learning needs: in most cases, none.

Hampered accommodation. Teachers in this group had a generally positive attitude towards technology use in teaching, but their uses of ICT were very limited due to their low technology-related self-efficacy beliefs. Teachers had developed different strategies for "hiding" the perceived incompetence in the course of ICT integration in teaching. For example, one teacher said that she selected digital tools and resources very carefully, trying to predict the level of technological competence of students she had to work with, and then adjusting her ICT use accordingly (Study IV). For these teachers it felt important to

integrate some technological elements in their teaching, while balancing this with efforts to maintain teachers' authority in the eyes of students. Teachers in this group showed concern about potentially harmful content that the students might see online. They always checked all the resources beforehand and kept and updated lists of appropriate websites, thus mainly acting as gate-keepers for students' use of digital technology (Study II). However, these teachers were keen on improving their ICT-related skills to keep up with technological development.

Intention to improve ICT skills: high.

Perceived learning needs: various software and hardware applications in teaching.

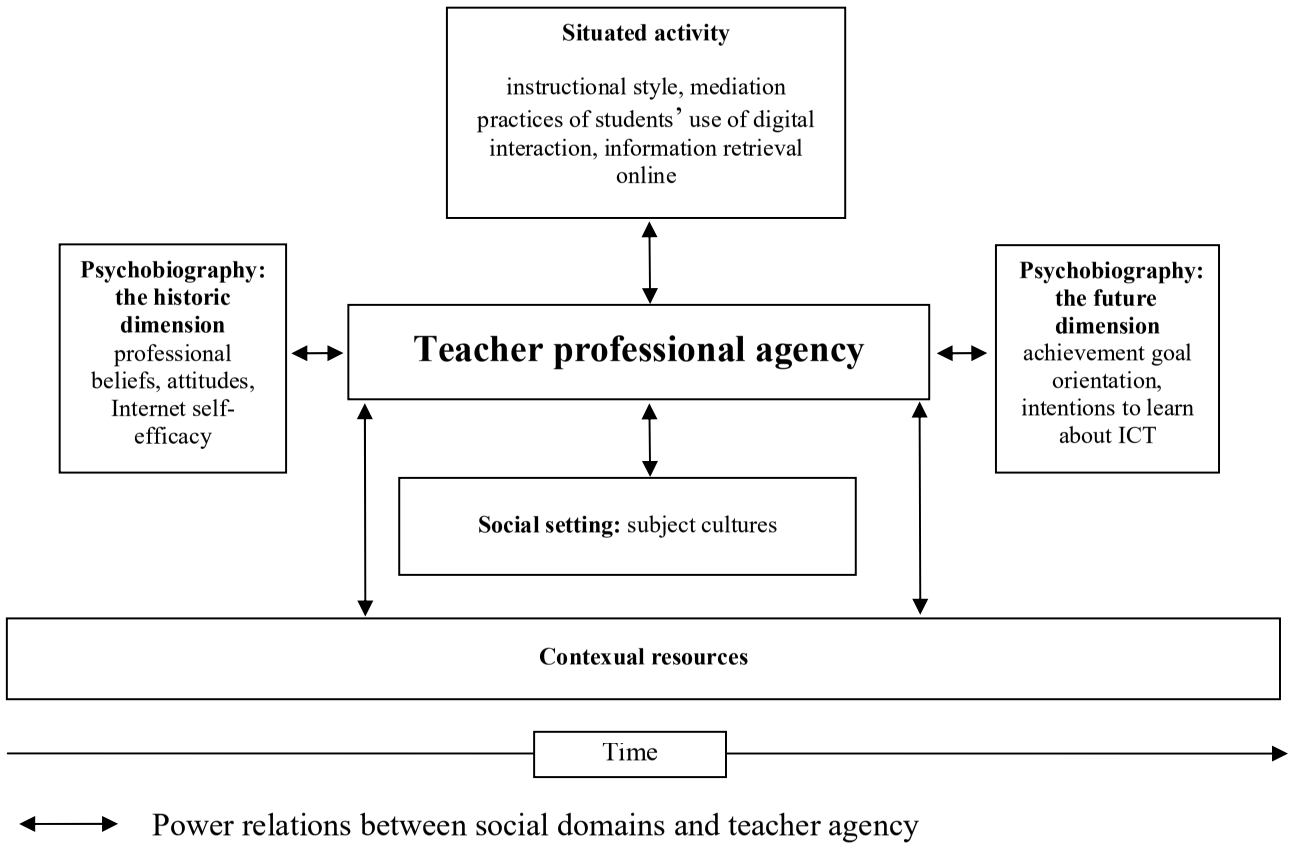
Sceptical ritualism. This was a small group of teachers, mainly language teachers, who had developed a rather negative attitude towards ICT despite their overall good online skills (Study III). The main claim among them was that they did not see the educational value of technology, apart from being a tool which could be used for relaxation and entertainment, but not for serious learning. In the interview transcripts, I found strong resistance to technology use based on teachers` biases regarding ICT (Study II). During the interviews teachers referred mainly to the specifics of their subject cultures as the main reasons for the very limited use of digital tools. Two reasons appeared to be dominant: teachers claimed that they did not see how the digital technology "fit" into their subject teaching, and digital resources in teachers' opinion lacked the values inherent in traditional means of teaching, e.g., the "institutional authority and reliability" (Kalmus, 2004:472) of school textbooks. In addition, several of the teachers believed that **proper** learning in their subjects required active student involvement and live conversation in the classroom (Studies I and II). However, teachers in this group talked about a few occasionally applied practices, which, in their opinion, gave some technological flavour to their teaching and therefore did not make them look as if they rejected ICT tools completely. This included asking students to make presentations about some subject-related topics, or allowing the best performing students to do exercises in the computer lab while other students stayed in the classroom and did pen and paper tasks. Characteristic of teachers in this group was the usage of ICT tools as substitutes for printed materials, e.g., textbooks, which involved turning on the smart board during the lessons, but only for demonstrations (Study I), using ICT as a relaxation tool which students could play with after the "serious work" was done etc.

Intention to improve ICT skills: none.

Perceived learning needs: none.

V DISCUSSION

The central concept in this introductory article was teacher professional agency and its construction and emergence in the process of ICT integration in subject teaching in secondary schools. I applied the notion of professional agency as teachers' active positioning towards technology integration and active engagement with the multitude of influencers stemming from four social domains of social life (Layder, 1997). The application of different theoretical frameworks and concepts from media studies, pedagogy and psychology in the individual Studies helped me to highlight the tensions and struggles that teachers face during the ICT integration process. Teacher professional agency is often understood as strongly linked to social setting and groups, emphasising the role of social resources in exercising agency (Lipponen & Kumpulainen, 2011). My doctoral thesis supports the notion that agency is resourced both socially and individually, and also draws on elements of "situational character" (Layder, 1997:92). The empirical findings described in the individual Studies indicate that personal factors, such as perceived self-efficacy, and various teacher professional beliefs belonging to the psychobiographical domain (Layder, 1997) work as mediators in the process of reasoning about situated activity (Studies II, III and IV). And vice versa, Studies I and II reveal that situational features and the interaction between teacher and student, and teacher and technology (the domain of situated activity), play a role in shaping teachers' perceived self-efficacy (Study II). One important point I want to stress here is that during my doctoral study I have become aware of the hidden bias that such theoretical concepts as self-efficacy beliefs, achievement motivation and others rooted in individualist psychology tradition carry with them. However, at the same time, it is important to acknowledge the pervasiveness of such conceptualisations as teacher professional beliefs and achievement motivation, just to name a few, in the research focusing on the pedagogic use of ICT. The availability of appropriate terms is a challenge to social scientists who want to maintain a degree of moderate objectivity in exploring teacher ICT practices. In my case, Layder's (1997) notions of human activity as related to various personal, situational, social and contextual influences helped me to move away from the too individualistic perspectives on the pedagogic use of ICT which I had adopted initially. The typology of teacher agency manifestations which I constructed in the present Introductory article by carrying out a meta-analysis of the initial findings of the individual Studies clearly reveals the "bounded" nature of human activity, and shows the dynamic interplay between personal, situational, social and contextual influences, with no one being superior to the others. In the context of my doctoral study, the idea of manifestations of teacher agency helped to clarify the variations in teachers' responses to the policies related to school digitalisation and ICT integration in teaching. Specifically, this doctoral study examined how teachers "do" their agency and how they "navigate" between the four interrelated domains of social life (Layder, 1997), with their specific properties which either can enable and encourage or constrain and regulate the use of ICT in teachers' work (Graph 2).



Graph 2. Teacher agency as located between and emerging within various personal, situational, social and contextual influences.

Graph 2 shows the complexity of teachers' positioning regarding ICT integration, and the typology of teacher agency manifestations, which was presented in the Results section helps to explain how properties of the various domains which influence ICT use by teachers are not necessarily linked to the technology itself. For example, I want to stress the contradiction between teachers' wish to exercise their autonomy in deciding about instructional style and methods while at the same time experiencing increasing pressures of standards and accountability rules regarding the outputs of the teaching process (Apple, 2001; Loogma et al., 2010). Through broadening the perspective of teacher agency, the reasons for variations in individual teachers' responses towards ICT integration become clearer. Actually, by examining a rather narrow aspect related to teacher work – the integration of ICT in teaching - my doctoral thesis reveals something about teachers' responses to much broader current societal dynamics and transformations that have influences on schools and educational systems. Here I should mention the shift towards the knowledge society and digital economy, the existence of the hype about students as the digital generation and digital learners, and the emergence of student-centred pedagogic approaches, where digital technology is seen as fitting in perfectly. As a result, teachers cannot help but engage in keeping up with the changes, trying to respond to several challenges and pressures simultaneously. Erss (2015:8) has problematised the "overly idealistic" approach to teacher autonomy expressed in national curricula and the sharp contradiction with the realities of working teachers who have to deal with accountability rules and pressures related to the introduction of centralised exams and subject curriculum demands. Drawing on the results of my dissertation, I agree that it is clear that teachers see their work and professional decisions as being notably constrained by the neoliberal trends which I analysed in Section 2, such as increasingly tightening external accountability rules and norms, and demands to maximise students' performance on centralised exams.

Balancing teachers' own perspectives, goals and values with the needs and interests of their students, as well as with the expectations and pressures of parents, headmasters, policy makers and other stakeholders, is a difficult task. Study V illustrated how dealing with the external pressures interacted with teacher's individual pedagogic theories. A teacher's strong feeling of responsibility for her students' success on exams and their future career prospects influenced the application of teacher-centred approaches to ICT use, in spite of the fact that the teacher was very familiar with the pedagogic value of the application of ICT in promoting student-centred teaching and learning. The empirical findings of Studies I and II indicate that for many teachers the subject cultures seemed to be something solid to adhere to in order to justify their chosen approaches to teaching. Kello (2015:31) has argued that, from the disciplinary approach, "instruction methods cannot be seen as a pick-and-mix assortment for the delivery of some separate content: rather, they are an inherent content". As the empirical data analysis in my doctoral study indicated, references to subject boundaries and arguments about the need to teach a

subject in one particular way in order not to jeopardise the results of the teaching process were mainly used by language teachers as "bullet-proof" arguments against the pressures of intensifying ICT integration.

Regarding teachers as ICT users, one central thought I want to stress here is that teachers actually cannot help but be active and agentic professionals when facing the challenge of ICT integration in teaching. As was outlined above, technology is often imposed on teachers more as a necessity than an option. I felt during the data collection stages that thoughts about ICT were "flying in the air". Therefore, one thing that definitely cannot be found in the interview transcripts is indifference towards ICT. That is rather understandable considering how high the issue of ICT integration is on policy agendas, and that policy makers and the ICT industry have been "pushing" technology in Latvian and Estonian schools for more than two decades, as was described in Chapter 2. My doctoral study provides insight into the ways in which teachers interpret the political message, and what subsequent courses of action they have taken. The results of the individual studies indicate that for some the arrival of ICT opened up new avenues for experimenting, playing and trying new teaching methods (Study V), while for others the use of ICT turned out to be a means of receiving external approval and creating and sustaining the image of being a "modern" teacher (Study IV). For many teachers in the samples the presence of ICT in schools had created situations where teachers had to re-consider their existing practices and make choices about how ICT could be "fitted" in. As Study IV demonstrated, some teachers approached ICT very pragmatically, acknowledging the potential of ICT in reducing teacher workload, freeing up some time during busy days and making lesson planning easier. The analysis of empirical findings indicated that a great deal of effort in the teacher's everyday work was directed towards helping the lower performing students' progress. The results of data analysis showed that ICT in such cases served as a means of keeping the highest performing students busy by doing tasks independently online, while the teacher worked with the low-performing students (Study IV).

In terms of teachers as mediators of students' use of ICT and promoters of students' digital skills, the findings indicate that teachers actively mediate students' use of technology by applying various strategies, from setting limits and guiding to broadening students' repertoires of technology application (Studies II and V). It is very difficult to measure the exact influence of mediation carried out by teachers considering the fact that students' use of technology is also mediated by other socialising agents, such as parents and peers. Study V problematised the issue of whether subject teachers should be held accountable for the development of students' digital literacy. The two case analyses described in Study V reveal that subject teachers can contribute to students' skills promotion in very different ways. Therefore, I suggest that subject teachers should not be viewed as the main providers of digital competences; rather, subject teachers' responsibility should be to demonstrate how the digital skills acquired in computer science lessons can be transferred to other

disciplines. Study I reveals that the application of ICT in subject teaching is closely related to the teacher's preferred instructional style.

Considering future research possibilities, one promising approach is to contribute to the limited number of studies of teachers as mediating agents for young people's use of digital technology. Regarding other research options, my doctoral thesis examined mediation as a property of the domain of situated activity (Layder, 1997) only from teachers' perspective. It would be useful to capture the ways in which students experience the mediation of technology use as it is performed by teachers. Additionally, I have addressed only one form of teacher agency, direct personal agency, not considering the collective or proxy forms of agency which might emerge during the educational change process. The temporal aspects of agency could be explored in future studies by applying a longitudinal research strategy with a focus on the continuity and transformation of teacher responses and courses of action in the implementation of educational reform.

Concerning teachers as learners about ICT, Study IV explored the under-researched issue of the relationship between teachers` ICT integration practices and their achievement goal orientations (the future dimension of Layder's domain of psychobiography), which determine the forms of new knowledge adoption and learning about ICT. This study indicated that teacher training needs and the willingness to be involved in professional development are closely linked to teachers' visions of what they want to achieve in their profession, and subsequently influence perceptions of what knowledge is beneficial for improving their practices. This has implications for future teacher training. I believe that paying attention to the learning needs and variations in the motivation to adopt new ICT-related knowledge could be a valuable starting point for re-considering existing in-service teacher training opportunities and the ways in which different seminars, courses, open lessons and other activities are targeted and marketed to the teacher community. Teacher learning can happen not only through involvement in formal teacher training, but also through informal experience exchange, participation in school- or subject-based networking, observation of colleagues' work etc. I want to propose that a balance should be sought in designing the different training opportunities by involving different prospective teachers` aims, and an understanding of how technology actually can promote the variety of achievement goals. In addition, my doctoral thesis has revealed that factors which create variances in teachers' responses to ICT policies are not necessarily directly linked to technology. This should be taken into account in designing teacher training programmes in the future. Based on the findings, it is clear that professional development inside schools, subject based peer-to-peer learning and shadowing of colleagues' work could help teachers to start overcoming at least some of the most dominant constraining factors, such as low self-efficacy beliefs and beliefs about the limited value of technologies in subject teaching.

It was stated above that technology has penetrated school systems not as an option but rather as a necessity for more than two decades now, because schools

cannot be detached from the wider social context and societal and cultural shifts (Saul, 2016). The implication for educational policy planning, however, is linked to the need to acknowledge the important role of teachers as mediators of ICT policy implementation and to pay close attention to the contexts in which teachers "read" and enact policy messages. It is therefore possible to understand why technology integration in schools happens in the ways it does. Understanding the complexity and multifaceted nature of the interplay of various factors shaping teachers' practices might lead to better policies and improved dialogue between policy makers and teachers. At least in Latvia, where for far too long teachers have been bluntly blamed for being too slow in integrating ICT into their practices. In my opinion, continuing attacks on "bad" teacher agency is a very unproductive path to follow. Through the whole text of this doctoral study, I have tried to maintain as neutral a position towards my dissertation topic as possible, which means that I have not celebrated some practices of ICT use or criticised or condemned others. I believe such an attitude is the key to technology-related educational changes in the future and should inspire future studies on digital technology integration in schools.

VI CONCLUSIONS

The main conclusions of my thesis are based upon the two main research questions.

(1) How are the influences of various social domains related to technology integration in teaching?

- Teacher stances and choices of ICT integration in teaching are related to a complex network of influences stemming from a range of personal, situational and societal factors. Self-efficacy beliefs, strong subject-related identity and the need to comply with teacher accountability policies appeared to be the most influential aspects examined in this doctoral study (Study I, II, III, IV and V).
- Teachers' perceived self-efficacy triggers differences in the ways in which teachers approach ICT and consequently how they integrate digital technology into their teaching. The choices of particular ICT tools and the amount of time that is spent on using digital tools in the classroom are reflections of how competent teachers feel in handing digital resources and tools (Studies I and II). However, perceived self-efficacy can be rather misleading: in Study III teachers' perceived Internet self-efficacy neither correlated with their actual search performance nor was it related to the search strategies that teachers employed. All of the teachers involved in the study over-estimated the difficulty of search tasks before starting a search.
- Teacher ICT-related learning needs can be understood through studying teachers' visions of what they want to achieve in their profession, and teacher perceptions of what knowledge is beneficial for achieving perceived goals (Study IV). Mastery goal orientation might predict the most active involvement in teacher training and readiness to adopt new knowledge and skills based on teachers' inherent motivation: interest and passion for technology (Study IV). Meanwhile, teachers with the ability-approach orientation are motivated to keep their ICT skills in line with the "good, efficient teacher" and "expert teacher in ICT use" images that they try to build. Thus it is possible to suggest that the ability-approach goal orientation promotes interest in learning, which leads to the reception of external rewards, e.g. in the form of appreciation and approval by the teacher community and other stakeholders (Study IV). For teachers with the work-avoidance goal orientation, ICT tools are primarily used to reduce workload, and thus intentions to get involved in teacher professional development are related to expectations of learning about new ready-made solutions and the exchange of ready-made teaching materials, which can be directly implemented in teachers' daily work (Study IV). The relational goal turns out to be

among the most maladaptive achievement motivations for involvement in professional ICT-related training and the motivation to integrate digital technology in teaching. Study IV indicates that relational achievement motivation limits the teacher`s interest in technology and its application in teaching practice.

- Teachers apply a wide range of mediation activities: they act as guides or coaches to help students make sense of the various opportunities that digital technology provides (Study II). At the same time, teachers also apply a variety of restrictions related to technology use according to their dominant pedagogical beliefs and subject domains. Teachers limit and control students' use of digital technology by setting rules on how students work with technologies, but also encourage students to use ICT for inquiry, group work and self-expression. Mediation tactics are related to the specifics of the task, teacher self-efficacy beliefs and beliefs about the level of technical skills of the particular group of students (Study II). The preferred instructional style is also a form of mediation of students' use of digital technology. Mediation happens through the selection of tools used in the classroom, the time students are allowed to work with technology and, more importantly, the design of the tasks (Study I).
- Teachers can promote a wide range of students' digital skills, although this is strongly related to aspects stemming from personal and societal domains, mainly teachers' preferred instructional styles, and the need to prepare students for centralised exams (Study V).
- Subject cultures seem to be an important influencer of ICT integration in teaching, especially in justifying why technology does NOT fit into teaching particular subjects. Adherence to subject cultures and particularly the notions of "subject boundaries" are used by some teachers as "bullet-proof" arguments against the pressures to intensify ICT integration in pedagogic practice. This doctoral study does not support the previous claim that science teachers are more open to ICT integration in their teaching than humanities teachers are. Differences are to be found among the same subject teachers and depend more on differences in the psychobiographical domain and the age of the students that teachers work with (Studies I and II).
- The need to prepare students for high-stakes exams triggers practices of ICT use which support the acquisition of particular skills or knowledge of the curriculum which teachers know will be tested on the exams. Teachers who do not face the exam burden feel much freer and more able to apply technology in their work than do their colleagues who have to prepare students for the centralised exams (Studies IV and V).
- For teachers with ability-approach orientation, the use of ICT turns out to be a means of creating an image of being a "modern" teacher (Study IV). Thus it is possible to suggest that the ability-approach goal

orientation promotes interest in learning, which leads to the reception of external rewards, e.g. in the form of appreciation and approval by the teacher community and other stakeholders (Study IV).

(2) How is teacher agency in technology use manifested when teachers navigate between different personal situations and social influences?

- Teacher agency in relation to ICT integration in teaching can be manifested in various ways. This doctoral study offers a typology consisting of five different types of teacher agency manifestation: enthusiastic appropriation, pragmatic assimilation, reserved balance, hampered accommodation and sceptical ritualism.
- Each type of teacher agency manifestation represents a set of features related to a number of personal, situational and social aspects, and the relationships between them, which shape and re-shape teachers' ICT practices. It would be wrong to think of pedagogic ICT use as being influenced by a small number of factors related directly and solely to technology.
- Variations in teacher agency manifestations reveal the underlying conflicts and inconsistencies between different values, pressures and demands which teachers try to balance in order to fulfil their professional roles and responsibilities.

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SUMMARY IN ESTONIAN

Õpetaja professionaalne agentsus digitaalse tehnoloogia integreerimisel õpetamisse Eesti ja Läti koolides

Doktoritöö "Õpetaja professionaalne agentsus digitaalse tehnoloogia integreerimisel õpetamisse Eesti ja Läti koolides" keskmes on tõenäoliselt ühed püsivamatest ja pikaajalisematest muutustest haridussüsteemides üle kogu maailma: püüdlused kasutada info- ja kommunikatsioonitehnoloogiat (IKT)[4] aineõppes. See on mõistetav, kuna erinevate riikide poliitikates on viimastel kümnenditel käsitletud koole kui osapooli, mis valmistavad ette IKT-pädevustega oskustööjõudu, kes oskab kasutada tehnoloogiat töö- ja igapäevaelus. Taoline suhtumine koolide positsiooni rõhutab IKT rolli iga õppeaine sidusa osana, kuid juba mõnda aega on see toonud teadusmaailmas huviorbiidile ka aineõpetajate reaktsioonid survele kasutada IKT-d õppetöös. Üsna hiljutise arenguna võibki ära märkida senisest suurema tähelepanu pööramist õpetajate agentsusele keset hariduse-alaseid muudatusi, mis on seotud IKT kasutuselevõtuga õppetöös.

Selle doktoritöö eesmärgiks on tuvastada, kuidas õpetaja professionaalne agentsus on väljendatud viisides, millega õpetajad tegutsevad erinevates personaalsetes, situatiivsetes ja kontekstuaalsetes tegurites, mis on seotud digitaaltehnoloogia integreerimisega õppetöösse nii Läti kui ka Eesti koolides. Minu doktoritöö aktuaalsus on ühest küljest seotud asjaoluga, et Euroopa õpetajad on üldiselt vabad otsustamaks kasutatavate õpetamisviiside üle, kuid teisest küljest mainivad õpetajad järjest piiravamaid töö hindamisvahendeid, väliseid hindamissüsteeme, aruandereegleid ning õppekavade nõudeid. Taolised pinged avavad viljakaid ning paljutõotavaid uurimisteemasid teadlastele. Minu doktoritöö teadusliku panuse keskmes on õpetaja agentsuse uurimine konkreetsetes kontekstides ning nii, nagu see ilmneb erinevate personaalsete, situatiivsete, sotsiaalsete ja kontekstuaalsete mõjude taustal. Seega olen paigutanud oma uurimuse sotsioloog Derek Layderi sotsiaalsete kihtide teooria raamistikku.

Tuginedes sotsiaalsete kihtide teooriale, olen püstitanud kaks peamist uurimisküsimust:

(1) Kuidas on mõjutused erinevatest sotsiaalsetest kihtidest seotud tehnoloogia integreerimisega õppetöösse?
Esimesele uurimisküsimusele vastamiseks olen esitanud erinevate kihtide poolseid mõjutusi arvesse võtvad alamküsimused:

[4] Mõisteid "digitaalne tehnoloogia", "info- ja kommunikatsioonitehnoloogia" (IKT) või lihtsamalt ka "tehnoloogia" on siin kasutusel sünonüümidena, kui ei ole märgitud teisiti. Kasutan neid katusmõistetena, pidades silmas erinevaid arvutipõhiseid süsteeme (nii riist- kui ka tarkvara, samuti internetipõhiseid rakendusi ja teenuseid).

Psühhobiograafia kiht:

- Kuidas on tajutav enesetõhusus ja teised tõekspidamised seotud õpetajate IKT kasutusega? (I ja III uurimus)
- Kuidas mõjutavad saavutuseesmärgid õpetajate motivatsiooni õppida IKT kohta? (IV uurimus)

Situatiivsete tegevuste kiht:

- Missugused on õpetajate rollid õpilastele digitaalse tehnoloogia kasutuse vahendamisel? (I ja II uurimus)
- Kuidas toetavad aineõpetajad õpilaste digitaalseid oskusi? (V uurimus)

Sotsiaalsete keskkondade kiht:

- Kuidas mõjutavad kooli aineõppe läbiviimise kultuurid seda, mil moel õpetajad integreerivad tehnoloogiat õpetamisse? (I, II ja V uurimus)

Kontekstuaalsete ressursside kiht:

- Kuidas mõjutavad kontekstuaalsed tegurid (näiteks tsentraliseeritud eksamineerimissüsteem või nõudmised õppekavale) seda, mil moel õpetajad integreerivad tehnoloogiat õpetamisse? (IV ja V uurimus)

(2) Kuidas väljendub õpetaja agentsus tehnoloogia integreerimisel, kui õpetajad tegutsevad erinevates personaalsetes, situatiivsetes, sotsiaalsetes ja kontekstuaalsetes mõjudes? Selle küsimusega on seotud kaks eesmärki. Esiteks, esitada erinevate uurimuste tulemused sidusal kujul. Teiseks, panustada seniste uuringute arengusse, mis selle asemel, et läheneda õpetaja agentsusele "muutuste poolt" vs "muutuste vastu" vaadete kaudu, püüab mõista õpetajate reageeringuid hariduslikele muudatustele oluliselt laiema spektri kaudu. Teisele uurimisküsimusele vastamiseks olen välja töötanud õpetaja agentsuse väljendusviiside uue tüpoloogia, mis tugineb I–V uurimuse esialgsete uurimistulemuste metaanalüüsile. Tüpoloogia kirjeldab viit erinevat õpetaja reageerimise tüüpi tehnoloogia integreerimisele õppetöös: entusiastlik omastamine (*enthusiastic appropriation*), pragmaatiline sulandamine (*pragmatic assimilation*), reserveeritud tasakaalustamine (*reserved balancing act*), piiratud kohanemine (*hampered accommodation*) ja skeptiline ritualism (*skeptical ritualism*).

Viisin doktoritööga seotud uuringud läbi Eestis ja Lätis. Need kaks riiki on huvipakkuvad näited IKT integreerimise kohta haridusesse väga mitmel põhjusel. Esiteks on pärast Nõukogude Liidu lagunemist 1991. aastal loetud digitaalseid töövahendeid poliitikate tasandil võimsateks vahenditeks, et jõuda järele lääneriikidele nii majanduslikult kui ka kultuuriliselt. "Tiigrihüpe" Eestis ja "Läti hariduse informatiseerimise süsteem" Lätis on olnud spetsiaalsed programmid, mis kutsuti ellu, et varustada koole digitaaltehnoloogiaga, ühendada neid internetiga ning koolitada õpetajaid IKT oskuste alal, et jõuda digitaaltehnoloogia kasutamiseni iga aine õpetamisel. Tänapäeval mainitakse kummagi riigi riiklikes õppekavades digipädevusi teiste üldpädevuste hulgas.

Pöörates tähelepanu doktoritöös kasutatud andmetele, võib öelda, et kõigis viies uurimuses olen kasutanud peamiselt sama empiirilist materjali. Töös kasutatavad andmed koosnevad 26 semistruktureeritud intervjuust erinevate aine-

õpetajatega Eestis ja Lätis (II, IV ja V uurimus) kombineerituna teiste andmeallikatega: tunnivaatlused (I uurimus) ning uurimus õpetajate infootsingulisest käitumisest veebis (III uurimus). Uurimuste kirjutamisel kasutasin erinevaid teoreetilisi raamistikke ning mõisteid erinevatest valdkondadest nagu psühholoogia, kommunikatsiooniuuringud ja pedagoogika. Seetõttu tuleks minu doktoritööd käsitleda interdistsiplinaarsena.

Minu doktoritöö peamised järeldused tuginevad kahele peamisele uurimisküsimusele.

(1) Kuidas on mõjutused erinevatest sotsiaalsetest kihtidest seotud tehnoloogia integreerimisega õppetöösse?

- Õpetajate seisukohad ja valikud IKT integreerimisel õppetöösse on seotud väga keeruka võrgustikuga mõjutustest, mis tulenevad erinevatest personaalsetest, situatiivsetest ja ühiskondlikest teguritest. Enesetõhususe tajumine, tugev ainevaldkonnaga seotud identiteet ning vajadus teha oma tööd hästi, vastavalt õpetajatele ette nähtud kvaliteedikriteeriumidele, ilmnesid siin doktoritöös kõige mõjukamate aspektidena (I, II, III, IV ja V uurimus).
- Õpetaja tajutav enesetõhusus mõjutab seda, kuidas õpetajad suhtuvad IKT-sse ja järelikult ka – kuidas nad integreerivad digitehnoloogiat õppetöösse. IKT vahendite valikud ja ajahulk, mille jooksul kasutatakse tundide jooksul digitaalseid vahendeid, peegeldavad seda, kuivõrd kompetentsetena tunnevad õpetajad end digitaalsete ressursside ja vahendite kasutamisel (I ja II uurimus). Siiski võib tajutav enesetõhusus olla ka küllalt eksitav: III uurimuses ei seostunud õpetajate tajutav enesetõhusus interneti kasutamisel tegelike otsingute teostamise edukusega ega olnud seotud ka info otsimisel kasutatud strateegiatega. Kõik uuringuss osalenud õpetajad ülehindasid enne otsinguga alustamist otsinguülesannete keerukust.
- Õpetajate IKT-ga seotud õpivajadusi saab lahti mõtestada, uurides esmalt õpetajate vaateid selle kohta, mida nad tahavad erialaselt saavutada ning teiseks õpetajate ettekujutusi selle kohta, missugused teadmised võivad olla kasulikud, et saavutada soovitud taset (IV uurimus). Meisterlikkusele orienteeritus (*mastery orientation*) võib viidata kõige aktiivsemale osalemisele õpetajakoolituses ning valmidusele kohandada uusi teadmisi ja oskuseid, tuginedes õpetajate sisemisele motivatsioonile, näiteks huvile ja kirele tehnoloogia vastu (IV uurimus). Oskustele lähenemise orienteeritusega (*ability-approach orientation*) õpetajad on aga motiveeritud hoidma oma IKT oskusi vastavuses "hea, efektiivne õpetaja" ja "ekspert-õpetaja IKT kasutamisel" ettekujutustega, mida nad üritavad enda puhul arendada. Seega on võimalik, et oskamisele orienteeritus toetab huvi õppimise vastu, mis lõpuks viib väliste tasude pälvimiseni, nt õpetajate kogukonna ja teiste sidusrühmade tunnustuse ja

heakskiidu näol (IV uurimus). Töö vältimisele orienteeritud (*work-avoidance orientation*) õpetajad kasutavad IKT vahendeid peamiselt töökoormuse vähendamiseks ja nii on soov end professionaalselt arendada seotud ootustega õppida uute valmislahenduste kohta ja vahetada juba valmis õppematerjale, mida saaks kohe õpetaja igapäevatöös kasutada (IV uurimus). Suhetele orienteeritus (*relational goal orientation*) osutus aga kõige vähem levinud saavutusmotivaatoriks IKT-ga seotud koolitustel osalemisel ning digitehnoloogia integreerimisel õppetöösse. IV uurimus näitab, et suhetele orienteeritud eesmärgipüstitus piirab õpetaja huvi nii tehnoloogia enda kui ka selle kasutamise suhtes õppetöös.

- Õpilastele digitaalse tehnoloogia kasutuse vahendamiseks viivad õpetajad läbi erinevaid tegevusi: nad tegutsevad kui giidid või treenerid, aidates õpilastel aru saada, missuguseid erinevaid võimalusi digitehnoloogia pakub (II uurimus). Samas seavad õpetajad ka piiranguid tehnoloogia kasutusele vastavalt oma peamistele pedagoogilistele tõekspidamistele ja ainevaldkonnale. Õpetajad piiravad ja kontrollivad õpilaste digitehnoloogia kasutust, kehtestades reegleid selle kohta, kuidas õpilased saavad töötada tehnoloogiliste vahenditega, samas ka julgustades õpilasi kasutama IKT-d uurimise, rühmatöö ja eneseväljenduse tarbeks. Tehnoloogiate vahendamise taktikad sõltuvad ülesande eripäradest, õpetaja enesetõhususe tajust, aga ka arusaamadest konkreetse õppijate rühma tehniliste oskuste taseme kohta (II uurimus). Eelistatud õpetamisviis kujutab endast samuti digitaalse tehnoloogia kasutuse vahendamist õpilastele: vahendamine leiab aset tunni ajal kasutamiseks mõeldud töövahendite valimise, tehnoloogiaga töötamiseks ette nähtud aja ning mis kõige olulisem, ülesannete ülesehituse kaudu (I uurimus).
- Õpetajad saavad toetada väga erinevaid õpilaste digitaalseid oskusi, kuid see sõltub tugevalt personaalsete ja ühiskondlike kihtidega seotud aspektidest, peamiselt õpetajate eelistatud õpetamisviisist ning vajadusest valmistada õpilasi ette tsentraliseeritud eksamiteks (V uurimus).
- Aineõppe läbiviimise kultuuridel on oluline mõju IKT integreerimisele õpetamisse eriti siis, kui on vaja põhjendada, miks tehnoloogia EI sobi konkreetse aine õpetamiseks. Ainekultuuridele truuksjäämine ja eriti "aine piiride" rõhutamine on mõnegi õpetaja jaoks kui nö kuulikindel argument IKT õppetöösse integreerimise vastu. Minu doktoritöö ei kinnita väidet, nagu oleksid reaalainete õpetajad humanitaarainete õpetajatest enam avatud IKT integreerimisele õppetöösse. Ka sama aine õpetajate puhul võib esineda erinevusi – need sõltuvad pigem variatiivsustest psühhobiograafilises kihis ning õpilaste vanustest, kellega õpetajad töötavad (I ja II uurimus).
- Vajadus toetada õpilasi riiklikel eksamitel mõjutab IKT kasutuspraktikaid, mis omakorda toetavad eksamil kontrollitavate konkreetsete oskuste või teadmiste omandamist. Need õpetajad, kes ei pea eksami pärast muretsema, tunnevad end palju vabamalt ja võimekamalt tehno-

loogia kasutamisel töös kui nende kolleegid, kes peavad õpilasi tsentraliseeritud eksamiteks ette valmistama (IV ja V uurimus).

- Oskustele lähenemisele orienteeritud õpetajate puhul osutus IKT kasutamine vahendiks, et luua endast tänapäevase või "moodsa" õpetaja mulje (IV uurimus). Nii võib öelda, et oskustele lähenemise orienteeritus toetab huvi õppimise vastu, mis lõpuks viib väliste tasude pälvimiseni, nt õpetajate kogukonna ja teiste sidusrühmade tunnustuse ja heakskiidu näol (IV uurimus).

(2) Kuidas väljendub õpetaja agentsus tehnoloogia integreerimisel, kui õpetajad tegutsevad erinevates personaalsetes, situatiivsetes, sotsiaalsetes ja kontekstuaalsetes mõjudes?

- Õpetaja agentsus seoses IKT integreerimisega õppetöösse võib väljenduda erinevatel viisidel. Oma doktoritöös pakun välja tüpoloogia, mis koosneb viiest erinevast õpetaja agentsuse väljendusest: entusiastlik omastamine, pragmaatiline sulandamine, reserveeritud tasakaalustamine, piiratud kohanemine ja skeptiline ritualism.
- Õpetaja agentsuse iga väljendusviis hõlmab hulka personaalseid, situatiivseid ja sotsiaalseid aspekte ning nendevahelisi seoseid, mis mõjutavad ja vormivad ümber õpetajate IKT kasutamise praktikaid. Oleks vale väita, et IKT kasutamine õppetöös on mõjutatud vaid väikesest hulgast teguritest, mis on otseselt ja ainult tehnoloogiaga seotud.
- Variatiivsused õpetaja agentsuse väljendusviisides paljastavad raskesti märgatavaid konflikte ja ebakõlasid erinevate ning sageli tehnoloogiaga mitte seotud väärtuste, survete ja nõudmiste vahel, mille keskel püüavad õpetajad leida tasakaalu oma professionaalsete rollide ja vastutuste täitmiseks.

Nagu minu doktoritöö näitab, leidub õpetajaid, kelle jaoks IKT kasutuselevõtt on avanud uusi võimalusi eksperimenteerimiseks, mängimiseks ja uute õpetamismeetodite katsetamiseks. Samas osutus teiste õpetajate jaoks IKT kasutamine vahendiks välise heakskiidu saavutamisel ning kaasaegse ja "moodsa" õpetaja kuvandi loomisel ning hoidmisel. Paljude valimisse kuulunud õpetajate jaoks on IKT kasutus koolides tekitanud olukordi, kus neil on tulnud ümber vaadata oma seniseid praktikaid ning langetada valikuid selle kohta, kuidas IKT-d õpetamisse sobitada. Minu doktoritöö raames läbi viidud viis uurimust viitavad erinevatele viljakatele tulevikus uuritavatele suundadele. Tuginedes oma doktoritöö järeldustele, rõhutan, et vaid siis, kui mõistame õpetajate olulist rolli IKT poliitikate elluviimise vahendajatena ja pöörame tähelepanu kontekstidele, kus õpetajad "loevad" ning viivad ellu poliitikate sõnumeid, on võimalik aru saada, miks tehnoloogia integreerimine koolides leiab aset just nii, nagu see aset leiab. Õpetajate praktikaid mõjutavate erinevate tegurite vastastikmõju komplekssuse ja mitmetahulise olemuse mõistmine võib viia paremate poliitikateni ning viljakama dialoogini poliitikakujundajate ning õpetajate kogukonna vahel.

PUBLICATIONS

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Professional employment

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2008 onwards	Lecturer at Faculty of Social Sciences, ViA
2007–2015	Senior project manager at ViA
2002–2008	Regional reporter at National news agency LETA
2000–2002	Regional reporter at news agency BNS

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Teadusadministratiivne tegevus:

2017…	Vidzeme Rakendusteaduste Ülikool, senati liige.

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