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Teaching Approaches and Instructional Reasoning Revisited

Mikko Tiilikainen

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University of Turku

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Doctoral Programme on Learning, Teaching and Learning Environments Research (OPPI)

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ABSTRACT

This thesis constructs a theoretical framework of the essential dynamic qualities embedded in teaching practice. The concept of *teaching dynamics* is introduced to signify the dialectic counterparts that function within the two suggested key domains of teaching practice: enactment of teaching approaches and teachers' instructional reasoning.

The thesis includes three part-studies and a Summary part. The qualitative data comprise three data sets: video observation data that captured five in-service teachers' actions through classroom practices; thematic interviews with in-service teachers to capture their thinking; and stimulated-recall interviews with 45 pre-service teachers to capture their thinking in action. The data were analyzed using abductive content analysis in which theory-driven categories played a critical role. The analytical approach aimed for conceptual generalization, as well as theoretical parsimony of teacher knowledge constructs.

The Summary part of the thesis synthesizes key results from the original part-studies into a conceptual framework of teaching dynamics. The framework presents three main loci of teaching dynamics: 1) teaching dynamics in teaching approaches; 2) teaching dynamics in instructional reasoning; and 3) integration of teaching dynamics. Each locus comprises two more sub-dynamics, resulting in six dynamic teaching mechanisms in total: the direct-constructivist dynamic; method-technique dynamic; instructional core dynamics; dispositional intention-attention dynamic; dynamics of choice in teaching; and learning-to-teach dynamics.

The six sub-dynamics are described and related to previous teaching and teacher education research. The teaching-dynamics system provides a practical framework that can be implemented in the development of teaching, teacher reflection and teacher education programs in both pre-service and in-service settings.

KEYWORDS: approaches to teaching; pedagogical reasoning; teacher knowledge; teacher education; educational theory; qualitative research

TURUN YLIOPISTO
Kasvatustieteiden tiedekunta
Opettajankoulutuslaitos
Kasvatustiede
MIKKO TIILIKAINEN: Opetustyön dynaaminen teoria: Opetuksellisten lähestymistapojen ja didaktisen harkinnan uudelleentarkastelua
Väitöskirja, 171 s.
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TIIVISTELMÄ

Tässä tutkimuksessa rakennetaan käytännön opetustyön monitahoisuutta jäsentävä teoreettinen viitekehys. Tutkimuksessa esitellään erityinen *dynaamisen opetusteorian* (*teaching dynamics*) käsite, jolla kuvataan opetustyön kahteen ydinosa-alueeseen – opetuksellisiin lähestymistapoihin ja didaktiseen harkintaan – sisäistyneitä kompleksisia ja toisiaan täydentäviä toimintaperiaatteita.

Tutkimus sisältää kolme osatutkimusta ja yhteenveto-osan. Laadullinen aineisto muodostuu kolmesta osasta: viiden luokanopettajan tuntitoimintaan kohdistuvista videohavainnoinneista, samojen opettajien didaktista ajattelua tarkastelevista teemahaastatteluista sekä 45 opettajaopiskelijan tuntitoimintaa ja siihen kytkeytyvää ajattelua yhdistävistä stimulated recall –haastatteluista. Aineisto analysoitiin teoriaohjaavalla sisällönanalyysilla, jossa teorialähtöisillä tulkintaluokilla oli keskeinen rooli. Analyyttisella lähestymistavalla pyrittiin käsitteelliseen yleistämiseen ja opettajan tiedon tutkimuksessa käytettyjen teoreettisten konstruktien synteesiin.

Yhteenveto-osassa osatutkimusten tulokset syntetisoidaan opetustyön dynaamisia ominaisuuksia kuvaavaksi käsitteelliseksi viitekehykseksi. Viitekehys paikantaa kolme aluetta, joilla opetustyön dynaamisuus toteutuu: 1) opetuksellisiin lähestymistapoihin sisäistynyt dynamiikka, 2) didaktiseen harkintaan sisäistynyt dynamiikka ja 3) yhdistetty opetusdynamiikka. Kukin kolmesta alueesta jakautuu edelleen kahteen tarkempaan aladynamiikkaan. Näin muodostuu yhteensä kuusi opetuksellisen dynamiikan toimintaperiaatetta: suorien ja konstruktivististen opetustapojen välinen dynamiikka, opetusmenetelmien ja –tekniikkojen välinen dynamiikka; opetuksen ydinrakenteen dynamiikka, opetuksellisen päämääräsuuntautuneisuuden ja tilannetietoisuuden välinen dispositionaalinen dynamiikka; opetuksellisten valintojen dynamiikka sekä opettajan oppimisen dynamiikka.

Kuusi opetuksellisen dynamiikan toimintaperiaatetta esitellään yksityiskohtaisesti ja niitä suhteutetaan aiempaan opetus- ja opettajankoulutustutkimukseen. Dynaaminen opetusteoria on tarkoitettu käytännölliseksi viitekehykseksi, jota voidaan soveltaa opetuksen, opettajareflektion sekä perus- ja täydennyskoulutusvaiheen opettajankoulutuksen kehittämisessä.

ASIASANAT: opetukselliset lähestymistavat; didaktinen harkinta; opettajan tiedon tutkimus; opettajankoulutus; opetuksen teoria; laadullinen tutkimus

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Seminaaripuutarhalta huhtikuussa,
Tidacticus

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List of Original Publications

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

Study I. Tiilikainen, M., Karjalainen, J., Toom, A., Lepola, J., & Husu, J. (2019). The complex zone of constructivist teaching: a multi-case exploration in primary classrooms. *Research Papers in Education, 34*(1), 38–60.

Study II. Tiilikainen, M., Toom, A., Lepola, J., & Husu, J. (2019). Reconstructing choice, reason, and disposition in teachers' practical theories of teaching (PTs). *Teaching and Teacher Education 79*, 124–136.

Study III. Tiilikainen, M., Toom, A., Lepola, J., & Husu, J. (2021). Student teachers' learning-to-teach patterns: connecting teaching approaches, teacher intentions, and self-perceived instructional impact. *submitted*.

Within all three articles MT contributed to the study conceptions and designs, data collections, analyses and interpretations; and was responsible for the writing of the manuscripts. In **Study I**, JK contributed to the study conceptions and designs; data collections, analyses and interpretations. AT, JL and JH revised and co-authored the manuscript for submissions and publication. In **Study II**, AT, JL and JH revised and co-authored the manuscript for submissions and publication. In **Study III**, AT and JH contributed to the study designs and data collection (This work was supported by the EU Lifelong Learning Programme, Grant 526318-LLP-1–2012-1-EE-COMENIUS-CMP; ACTTEA-project). AT, JL and JH revised and co-authored the manuscript for submissions and publication.

1 Introduction: The Aim of Teaching Dynamics

1.1 Teaching-dynamics concept

The purpose of this thesis is to elaborate a theoretical framework of the essential dynamic qualities embedded in teaching work. Since the outset of research on school teaching, classic sources have underlined the complex and tensioned nature of teaching practice (Jackson, 1986). This complexity also has been viewed as a necessary aspect when one attempts to understand the nature of teachers' work. Foshay (2000, p. 3) illustrated the different complex interactions at the heart of teaching activity in a rather striking way:

> "*There would be theoretical (6 x 10 x 9)^2 /2 = 145,800) interactions. Some of these are bizarre and would be ignored. But most of the interactions actually take place as one teaches.*"

These complex interactions in Foshay's (2000) graphic "curriculum matrix" emerge both from the qualitative differences in the instructional elements – i.e., various purposes, content, and teaching practices – and the number of interactions when all the differing elements collide during teaching. I would assert that other teacher education scholars have described the same complexity, but from slightly different perspectives, and arrived at similar conclusions. In describing teaching's complexity at different stages of the instructional process (planning, interacting, and reflecting), Shulman (1987) highlighted decision-making and has accompanied reasoning as a key capacity of teachers (see also Clark & Peterson, 1986). Shavelson (1973) even concluded that *decision-making* must be *the* basic teaching skill, and Shulman (1987) specified the unique knowledge base (*pedagogical content knowledge*) through which decisions are made in teaching. Later studies also examined the complex interactions between the various components of pedagogical content knowledge in teacher learning (Aydin et al., 2014). In the latest edition of their classic textbook on classroom teaching research, Good and Lavigne (2017) confirmed that the idea of decision-making remains one of the most comprehensive ways to illustrate teaching practice. They drew on the Doylean conception of teaching and use four

characteristics to illustrate the nature of classroom teaching and the decisions needed in teaching: *multidimensionality*; *simultaneity*; *immediacy*; and *unpredictability* (Good & Lavigne, 2017, pp. 6–7).

Other elements and specifications have been introduced. Lampert (1984) introduced a twist of tension in teachers' decision making: Various conflicting demands permeate the work of teaching to such an extent that the whole activity of teaching can be called *dilemma managing*. Labaree (2000) added to this by stating that the demands and decisions in teaching not only create many dilemmas, but also are very challenging. Thus, he ends up describing teaching work as "an enormously difficult job" (Labaree, 2000, p. 228). Husu (2002) emphasizes the underlying explanation behind these dilemmas in his analysis of teachers' narrative knowledge. When drawing together the major tenets of teachers' practitioner knowledge, he stated (p. 101, italics and brackets added): "Within that activity (the activity of teachers' pedagogical knowing), one common feature was identified: *uncertainty*." The "uncertainty principle" (cf., Barad, 2007) emerges both at the action level of teaching (Labaree, 2000), as well as in teachers' thinking (Husu, 2002), functioning as a platform out of which further complexities spring. Thompson et al. (2018) even suggested that the contradictions that teachers experience in their daily practice may develop into outright *paradoxes*.

This raises a question: What unites all these notions of decision-making, dilemma-managing, and pedagogical uncertainty? In the present thesis, I assert that the most comprehensive way to understand teaching work is to use the teaching-dynamics concept. This idea includes all the aforementioned notions, but offers an even more accurate way to represent the multidimensional nature of teaching's core aspects. The first part of this conceptualization indicates that my focus is on teaching, and I use the term *teaching* here to refer to the teacher's role in the instructional teaching-studying-learning process (Kansanen et al., 2000). *Studying* refers to students' corresponding activities (doing), while *learning* signifies possible outcomes from the instructional process. Both the teacher and students – together ideally – may learn through various sorts of doing (Kansanen et al., 2000). Therefore, classroom interaction should be called *teaching-studying interaction*, rather than *teaching-learning interaction*. Accordingly, pedagogical research can focus more on teachers and teaching, or on students' learning (Gurung & Schwartz, 2013). Although these foci are, in many ways, intertwined, my focus is on teachers and teaching.

In my view, the teaching-dynamics concept implicitly is present in much of the previously mentioned teaching and teacher education literature, and although the word "dynamic(s)" has been used explicitly to describe some features of teacher knowledge (e.g., Russ et al., 2016), it has not yet been formulated and used to delineate the kind of totality perspective on teaching presented in this work. The

notion of *dynamic interaction analysis* is topical in pedagogical learning research, referring to match or mismatch levels between instructional guidance and students' independent functioning (Vauras et al., 2013; see also Kajamies, 2017; Salonen et al., 1998). An optimal level of teacher scaffolding creates a dynamic, constructive friction in which "…the learner is pulled by moderate growth-promoting discrepancies toward new levels of independent activity" (Vauras et al., 2013, p. 127). My conception of teaching dynamics includes a similar type of shifting variances, and I examine them more *within the acts of teaching* (cf. Kansanen et al., 2000). However, it is of cardinal importance to note that I also touch on student learning in some key parts of this thesis. Rather than analyzing student learning at the object level of scaffolding, I accomplish it *phenomenologically* (cf. van Manen, 2015), so to speak, *by locating student learning within the realm of teacher reflection*. In fact, this kind of teacher reflection *about* student learning can be viewed as a vitally important part of teachers' role in the instructional process – which is to teach (cf. Kansanen et al., 2000). Consequently, teachers and student teachers' process of *learning to teach* imperatively revolves around their students' (pupils) learning. Formulated this way, learning exists on several planes in this work.

According to the *Cambridge Dictionary* (2021), the term *dynamic(s)* can be defined as something "continuously changing or developing," "relating to forces that produce movement," or that is "energetic and forceful." As a plural noun, *dynamics* refer to "forces that control the relationships people or things have with each other and how those relationships can change." While encompassing a wide range of definitions, the latter definition most effectively captures the meaning I have in mind when using the teaching-dynamics concept, particularly because I use the concept in plural form: Several dynamics, acting as dialectic counterparts, are at work within teaching practice. However, I slightly deviated from the strict *Cambridge Dictionary* definition in two ways: I partly replaced the notion of "forces" with "multitude of aspects" and partly replaced the notion of "change" with "influence" and simply "relation." By making these adjustments, I aimed to indicate something more moderate, at least in the beginning. Teaching dynamics is intended to denote a multitude of aspects, various alternatives, and movement between complementary elements present in teaching's core qualities. This multitude of aspects then might transform into "forces" in the flow of teaching activities. By analyzing these multiple aspects, one can arrive at a better understanding of these "forces," i.e., the aspects and their relations help explain the movement and forces in teaching. Also, the "influences" and qualitative "relations" between the aspects precede "changes," i.e., mutual influences exist first, then possibly elicit various sorts of changes. Again, my focus lies primarily in the relational influences because they are more basic and can be applied in the analysis of changes in teaching practice

in the future. Thus, my preliminary working definition of *teaching dynamics* – and the topic of this thesis – could be formulated as follows:

> *The various aspects and dialectic counterparts that control the essential elements and relationships that (people and things) have with each other in teaching and how these relationships are connected and influence each other in teaching practice.*

So, why is the idea of teaching dynamics important, and where do we need it? After all, have the various multidimensional qualities not been covered sufficiently in teaching and teacher education literature before? My answer is that much of this ground, indeed, has been covered. For example, Toom et al. (2015), in their close qualitative inspection of student teachers' portfolio reflection, discovered that student teachers *learning to teach* in the context of teaching practicums represent varying degrees of reflective thinking's dynamic qualities. In-depth processing of experienced teaching incidents – *learning from practice*, as the authors plainly conceptualized it – actually *emerges as a result of dynamic reflection* on practice (Toom et al., 2015). In their review of teacher learning research, Russ et al. (2016, pp. 398–399) classified some of the studies conducted in the 1980s and 1990s under the category of *dynamic decision-making* research. I argue that certain gaps exist in the literature based on our understanding of teaching. From my perspective, these gaps tend to exist not so much in new ground that must be unveiled, but rather in older, already-established teaching concepts that need to be revisited. For many aspects, I join the dynamic decision-making tradition and try to elaborate it further in this thesis. In the national Finnish context, the professional decision-making paradigm has been prevalent in teaching and teacher education systems (see, e.g., Kansanen et al., 2000). However, I found very little recent teacher-decision-making research, apart from a study by Männikkö (2019) on teachers' reflective inquiry.

The main gap in recent extant research on teaching that my thesis aims to fill is a lack of systematics in different constructs and conceptualizations that capture various forms of teacher action and knowledge (cf. Toom, 2017). This lack of cohesion and coherence can lead to conceptual confusion, i.e., the same concepts might be used to describe different things, and different concepts may be used to refer essentially to similar things. To address this, a theoretical synthesis is needed. Also, the lack of parsimony is something that requires elaboration as to whether or not some of the areas in teacher action and knowledge form upper-level categories that can be used to organize more detailed explorations. Furthermore, the question is not only "Do the differing conceptualizations of teachers' work overlap," but also, "Do we need to (un)cover all the areas of teacher action and knowledge in the first

place, particularly in the context of teacher education?" and "Are some of the areas more primary than others, and even essential?" A need exists for theoretical coherence in teacher education research, which carries implications for the coherence of teacher education policy and practice (Mayer & Oancea, 2021).

Another gap emerges when the previous ones are elaborated: What kind of qualitative patterns can be found when reformulated theoretical constructs are employed in the analysis of empirical data? The major goal is again a more conceptual one that is addressed partly in this introductory chapter. When one reviews the teaching and teacher education literature, the complexity of teaching work often is portrayed in terms of challenge and difficulty. Terms such as *dilemma-managing* and *ever-present uncertainty* may carry a slightly negative connotation. I think this is reasonable in its own right, but with the teaching-dynamics concept, I aim at a more positive – or rather more *neutral* – conceptualization. I do not intend to emphasize any plus or minus sides to teaching as such, but rather to capture this teaching complexity more descriptively, thereby offering a potentially broad range of applicability. My goal is to uncover the underlying mechanisms that possibly cause many of the tensions and dilemmas in teachers' experiences when they work in the midst of these dynamic teaching interactions. Therefore, teaching dynamics could be conceptualized as the *dynamic mechanisms of teaching*, but for the sake of simplicity, I use the shorter expression *teaching dynamics*.

Extant research on teaching, teachers, and teacher education has been conducted along two major foci: teachers' observable classroom actions and their thought processes (Ball & Forzani, 2009; Clark & Peterson, 1986; Gitomer & Zisk, 2015; Mayer, 2014). The consensus in the field is that there is something that teachers "need to know," as well as something they should be "able to do" (Gitomer & Zisk, 2015; see also Mayer, 2014). However, this is where the simplicity ends. Research on both teacher thinking and actions comprises differing constructs and conceptualizations (Toom, 2017), and this conceptual diversity can be called into question. Is it possible that in some cases, different concepts may be used to describe the same thing, while in other cases, the same concepts may be used to capture different things? This leads to another question: Would it be possible to recognize some core capacities within teacher actions and thinking that are necessary to understand teaching work? If so, these key capacities could function as organizing concepts for more fine-grained constructs in research and help develop teacher education programs. In short, the aim of teaching dynamics is to parse the key teaching complexities in a simplified, reductive manner.

I should note that in my framing of the research topic, I treat *teaching* and *teacher education* as an extended whole because research on teachers, teaching, and teacher education actually represents a united disciplinary tradition of its own, in which the implications of teaching are often immediately, and at least implicitly, applied in

discussions on teacher preparation (cf. Labaree, 2000). Also, teacher education can be understood as a continuum that covers both initial teacher training and the later stages of in-service teacher development. In this sense, in a way, teaching always takes place in some context of formal or informal *teacher education*. In some parts of the thesis, the focus is on teacher education specifically due to a particular data set, e.g., one comprising student-teaching cases. When this occurs, it is noted in the text.

The first step in filling the aforementioned research gaps is to address the question of the essential areas of teaching dynamics. Whereas contemporary developments have started to cover new and broader areas of teacher expertise – e.g., moral, societal, etc. – uncovered ground remains, concerning what I view as the two unique core aspects of teaching work: enactment of different *teaching approaches* and accompanying *instructional reasoning*. My choice of these two teaching-dynamics loci (from the Latin "places") stems from a well-established research base. Clark and Peterson (1986) demonstrated that research on teachers and teaching can be categorized into two main areas: Teachers' thought processes on one hand and teachers' observable classroom actions on the other. Of course, it is also possible to combine these two, as is the current tenet in teaching and teacher education research (e.g., Gitomer & Zisk, 2015; Toom et al., 2019; Vesterinen et al., 2014).

1.2 Teaching approaches and instructional reasoning: the two key teaching-dynamics loci

It is important to consider the definition of *teaching* when examining teacher thinking and classroom action. This conceptual analysis reveals the necessary and sufficient conditions for teaching activity, providing guidance on how to delineate key capacities within teaching work. Although definitions of teaching do vary, some minimal conditions can be provided. I express the definition here in this way: Teaching entails a relation comprising three elements – a) teacher(s), b) student(s), and c) curricular substance – in which the teacher conveys curricular substance to the students (e.g., Biesta & Stengel, 2016; McClellan, 1975; Fenstermacher & Richardson, 2005). It should be noted that this is supposed to be an analytical *definition* (of the meaning) of teaching, not a *characterization* (of function) e.g., of a specific kind of teaching approach or specific personal teaching philosophy or conception. Even as a definition, it can be challenged, but I still agree with Biesta and Stengel (2016) that the definition at least moves in the right direction and functions as a starting point in further scrutiny of teaching conceptions (cf. Fenstermacher & Richardson, 2005) – in my case, teaching approaches. Also, it is important to note that in my vocabulary, the curricular substance or content of teaching refers principally to the entire curricular spectrum, including moral,

emotional, existential, aesthetic, and social aspects, for example (Foshay, 2000; for the multi-faceted nature of curricular substance, see also He et al., 2015). Furthermore, I argue that the teacher's core action capacity can be inferred from the definition above rather directly. Upon this basis is the enactment of *teaching approaches*, i.e., different ways of arranging instructional activities in which students encounter curricular substance in the classrooms. Next, I suggest that the teacher's key thinking capacity mainly relates to the teacher action level (Kansanen et al., 2000), in which enactment of different teaching approaches takes place. The kind of thinking I am referring to entails the teacher's consideration of the three stakeholders – teachers themselves, their students, and the curricular substance – and uses these as grounds for selecting between different teaching approaches. I call this grounding process in teachers' thinking *instructional reasoning.*

I assert that linking teaching approaches and instructional reasoning represents a dynamic conception of teaching, in that both teaching approaches and instructional reasoning could be examined without such an explicit connection. The lead idea – a kind of "starting point" – for this in my thesis is that teaching approaches and instructional reasoning organically belong together, forming a dynamic pair in teaching practice, as well as in teacher learning. This dynamic notion is premised, for example, in Kennedy's (2016) statement that teacher education should focus on representing classroom practices while also linking teachers' purposes behind these very practices.

1.2.1 Enactment of teaching approaches as the first locus of teaching dynamics

Enacting different teaching approaches forms the unique core aspect of teachers' work in schools (Fenstermacher & Soltis, 2009). When teaching activity as a whole – i.e., the instructional process – is understood in terms of the teaching-studying-learning process (Kansanen et al., 2000; Pitkäniemi, 2009), teaching approaches signify teachers' different ways of organizing students' study activities through various teaching actions. In the European didactic tradition, didactical aspects are viewed as forming the core of the instructional process (Kansanen & Meri, 1999; Toom et al., 2019). Didactics combine pedagogical and curricular aspects in teaching, referring to the teacher's practical ways of conveying subject matter to students (Kansanen & Meri, 1999). Enactment of teaching approaches then encapsulates the core of didactics: teaching approaches through which the didactics are put into practice in classrooms. Teaching approaches have been a classic topic of interest in educational research on teaching work, particularly with regard to questions about their efficacy (Fitzgibbons, 1981; Gage, 2009; Good & Lavigne, 2017).

Teaching approaches have been referred to using various concepts, with seemingly no single established term for the phenomenon. Concepts such as *approaches to teaching* (Fenstermacher & Soltis, 2009), *conceptions of teaching* (Sato, 2014), *teacher beliefs* (Fives et al., 2015), *teaching methods* (Struyven et al., 2010), and *models of teaching* (Pitkäniemi, 2009) have been used to refer to teaching approaches. Some conceptualizations include aspects of teachers' thinking on classroom practices, whereas others refer more exclusively to teachers' classroom actions. In the present thesis, I define *teaching approaches* as referring only to observable classroom activities, including students' study activities that the teacher organizes. This helps avoid conceptual confusion between teacher thinking and teacher action levels to allow for examining connections between the two. Considering that teaching and teacher education literature is filled with different conceptualizations that illustrate teacher knowledge and action, this basic divide helps simplify the field. Other concepts more aptly describe the varying aspects of teachers' thought processes, and in my thesis, I suggest some ways to address these conceptual descriptions.

Categorizations of teaching approaches vary, but a shared conviction seems to exist, essentially asserting that two kinds of teaching approaches exist. This split has been conceptualized, for example, in terms of *information transmission/teacher-focused vs. conceptual change/student-focused approaches* (Chen & Brown, 2016; Prosser & Trigwell, 2014; Struyven et al., 2010), *subject-centered vs. student-centered approaches* (Lam & Kember, 2006), *student-centered active learning vs. teacher-directed transmission of information* (Campbell et al., 2001), and *constructivist vs. transmissionist approaches* (Fives et al., 2015). Other types of conceptualizations are found in the field of applied educational psychology and instructional design research, in which efficacy variations between different teaching approaches are compared. Here, concepts are more operational, such as *active-direct* vs. *guided-inquiry* methods (Schuster et al., 2018). Some scholars in the Anglo-American tradition have formulated teaching approaches using synthesizing perspectives from research on school teaching and applied educational psychology. Gage (2009) formulated two comprehensive teaching approaches: the *Conventional-Direct-Recitation* (CDR) and *Progressive-Discovery-Constructivist* (PDC) models. Both signify the different names for the approaches used over several decades. Good and Lavigne (2017) called the first kind of approach *active teaching* and used the metaphor of *construction* for the latter.

Fives et al. (2015) claimed that the much-used splits in teaching approaches present several problems. First, it is not clear whether the categorizations accurately conceptualize actual teaching approaches or rather certain kinds of learning principles. This is the case, for example, in the context of so-called "constructivist" teaching. Second, the splits are too dichotomous, i.e., they do not sufficiently

describe the complexity and combinations of teaching approaches that may manifest in teachers' everyday classroom practices (see also Belo et al., 2014; Goodwin, 2013). Third, the categorizations are often prescriptive, rather than descriptive, i.e., the classifications tend to grant specific teaching approaches a higher normative status without clear normative (e.g., practical, ethical, etc.) reasons for these ranking lists (Fives et al., 2015). A truly normative – i.e., philosophical – analysis of teaching approaches (Fenstermacher & Soltis, 2009) indicates that the enormous complexity of teaching practices and factors for teachers to consider in their classrooms suggests that at a general level, teachers only can be trained to become experts on *all* the various main approaches and apply them flexibly in practice.

Fenstermacher and Soltis (2009) operate with a three-tiered conception that comprises the following: the *executive approach; facilitator approach;* and *liberationist approach*. The executive approach resembles the CDR model most when compared with Gage's book, whereas the facilitator comes closest to the PDC model (Gage, 2009; see also Sato, 2014). The philosophical nature of the treatment by Fenstermacher and Soltis (2009) appears in the liberationist approach, which is not primarily any kind of combination of the previous two approaches, but rather a third philosophical lens of its own, aside from the other two, used to interpret the comprehensiveness of school teaching. The empirical applications of such philosophically informed notions of teaching approaches are rare. The most useful elaboration of teaching approaches from the perspective of my work comes from Pitkäniemi (2009). In his theoretical analysis, he starts with approaches that educational philosophers created, then synthesizes them operationally from the instructional activity perspective, albeit conceptually.

Pitkäniemi (2009) works explicitly in the theoretical context of the teaching-studying-learning process, conceptualizing an intact notion of teaching approaches that focuses on the teaching-studying interaction in instructional activity (Pitkäniemi, 2009). Thus, two main approaches are formed: the *presentation model* and *construction model* (Pitkäniemi, 2009) (please consider their connection to the notions of other authors whom I reviewed above). Two qualifying categories then are added that further specify how both of the main approaches can be enacted – *the one-way* application and *multi-way* application – in which the one-way categories refer to the more basic ("pure") modes of presentation or construction approach (Pitkäniemi, 2009). The multi-way adaptations represent intermediate approaches that combine presentation and construction into teaching-studying activity while emphasizing one or the other (Pitkäniemi, 2009). In the course of this thesis, I modify and apply in particular the Pitkäniemi (2009) model of teaching approaches due to its focus on instructional activity and the model's dynamic implications.

Rather surprisingly, extant research on in-service schoolteachers and student teachers' teaching approaches, as far I know, has not gained very much attention

recently. For example, it is interesting to note how Sato (2014), in her policy analysis, draws mainly on classic and often philosophically informed systems of teaching approaches, rather than on later empirical developments. Fives et al. (2015), in their review, noted that challenges exist in this research field that call for further development. Drawing on their review, current research on teaching approaches calls for conceptual clarity in the categorization of teaching approaches, less emphasis on unwarranted normative recommendations of some teaching approaches, and avoidance of simplified dichotomies often used in teaching approach research, instead advocating for examination of the differing combinations that teaching approaches often may manifest (see also Darling-Hammond, 2008; Goodwin, 2013). My aim in revisiting teaching approaches in the present thesis is to lay out a framework that makes more sense of the dynamic features in teaching approaches – more specifically, what relevant alternatives among teaching approaches can be used and how do they overlap in classroom practice and teacher thinking? Incorporating dynamic qualities into interpretations of teaching approaches might pave the way toward more responsive, combined, and flexible adaptations of teaching approaches in real-life classroom situations and in teacher education (cf. Darling-Hammond, 2008). In this scenario, the selection of teaching approaches can be framed first and foremost as dynamic choices in teaching that require wise judgment from the teacher.

1.2.2 Instructional reasoning as the second locus of teaching dynamics

When teaching approaches are conceived in terms of dynamic choices in teaching, the matter of choosing leads us to consider teacher thinking and the judgment needed to make choices. Myriad constructs denote different characteristics of teacher thinking (Clark & Peterson, 1986; Fenstermacher, 1994; Toom, 2017), but I focus here on instructional reasoning as a critical form. Instructional reasoning is a part – or form – of teachers' broader *practical knowledge* (see, e.g., Rosiek & Gleason, 2017), which signifies the action-oriented and often-experience-originating nature of teacher thinking (Clandinin & Husu, 2019), concerning teachers' daily practices, e.g., promoting student engagement and managing classrooms (Rosiek, 2003). The practical knowledge tradition emphasizes that theoretical intellect and scientific knowledge base as such are not accurate lenses through which to capture teachers' thought processes, but rather that teacher thinking is best described as practical understanding organically embedded in teachers' work and actions (Clandinin & Husu, 2019).

The "practical knowledge landscape" also has elicited a significant research paradigm in which teacher thinking has been examined from teachers' own unique perspectives (Clandinin & Husu, 2019; Rosiek & Gleason, 2017), often linking with

intensive everyday classroom practices (Männikkö, 2019) in which teachers' practical understanding is nevertheless viewed as having its own unique structural and principled characteristics (Fenstermacher, 1994; Mena & Clarke, 2015). The theoretical and scientific elements play a role in teachers' practical knowledge, but usually are embedded in a broader structure of practical understanding, in which other elements, such as highly situation-specific notions (Fenstermacher & Richardson, 1993) and tacit intuitions (Toom, 2012), are also prevalent. Practical knowledge can be viewed as deeply personal (Clandinin, 2013) and artistic (Toom, 2012), to the extent that it also has been conceptualized and termed *personal practical knowledge* (Clandinin, 2013; see also Husu, 2002).

Recently, studies have focused on the development of student teachers' practical knowledge in various action-oriented, supervisory settings in the context of teaching practicums (Allas et al., 2017; Mena et al., 2016; Toom et al., 2019). Argumentative teacher knowledge that manifests in the form of practical and theoretical reasoning is viewed as a key component of teachers' practical knowledge, along with descriptive and inferential knowledge types (Allas et al., 2017; Mena et al., 2016; Toom et al., 2019). Thus, instructional reasoning can be viewed as part of teachers' broader practical knowledge structure, which should be analyzed and developed systematically in teacher education (Penso & Shoham, 2003; Vesterinen et al., 2014).

Loughran (2019) argues that teachers' instructional reasoning can be viewed as foundational to practical knowledge in the teaching profession and required during different teaching stages (Loughran, 2019). Due to its close ties with classroom practice, instructional reasoning tends to manifest the most practically relevant aspects of teacher knowledge, and it also makes teachers' professional knowledge visible and an object of collegial development (Loughran, 2019). When conceived from the perspective of philosophical action theory, instructional reasoning can be viewed as *practical reasoning* (Audi, 2006) in teachers' work. Practical reasoning refers to thinking that aims to decide what to do and how to act with regard to everyday practical problems. It can be distinguished from the other main form of reasoning, theoretical reasoning, which aims to decide what is true or what is the case concerning some matter (Audi, 2006). Scholars such as Fenstermacher and Richardson (1993) started to highlight how the notion of practical reasoning can be used to illuminate and develop teacher thinking, as it captures the action-oriented nature of teacher knowledge.

Teachers' practical reasoning encompasses not only theoretical, but also situational, value-based, and other kinds of "premises," with the whole purpose of such reasoning being to orient classroom action – rather than theorize for its own sake (Fenstermacher & Richardson, 1993). Two perspectives on teachers' practical reasoning should be distinguished: teachers' everyday practical thinking between different courses of action, which largely can be tacit on one hand, and formalization

of this practical thinking into a practical argument that comprises specific premises and conclusions (in which the conclusion is some action or, possibly, an intention to act) on the other (Fenstermacher & Richardson, 1993). In the present thesis, I mainly focus on the first perspective, i.e., the more inclusive manifestation of teacher reasoning. However, I realize that this kind of everyday form of teacher reasoning sometimes can include more formal characteristics of argumentation.

The conceptual relations between (choices in) teaching approaches and instructional reasoning are reciprocal: Reasoning is needed exclusively in choosing (Korsgaard, 2015), on one hand, and choices require or lead to teacher reasoning on the other. The immediate connection to teaching practice – in my case, enactment of teaching approaches – provides a certain kind of "primary status" to instructional reasoning within the broad scope of teacher knowledge. Many other types of teacher knowledge – e.g., beliefs, values, metaphors, visions, principles, etc. – do not carry such a directly normative and practical potential because they are not necessarily required to make choices in teaching approaches, whereas practical reasoning to some extent does. However, they may have instrumental value, e.g., other types of teacher knowledge can be said to have practical significance mainly due to some connection to, being individual parts of, or unravelling something of the comprehensive instructional reasoning structure. Orton (1997) states that philosophical (e.g., Aristotelian) and more clinically oriented (e.g., Shulmanian) modes of teacher reasoning can be synthesized into a solid framework of teacher knowledge that represents both the normative and effective concerns embedded in teacher action. Practical reasoning has been applied to analyze teacher thinking that covers teaching practice more generally, including, for example, the different moral features of teaching (Gholami & Husu, 2010). In my work, I approach instructional reasoning with a narrower scope, defining it as *teachers' practical reasoning* that:

a) *aims to make* choices in teaching approaches

b) *focuses on* instructional core elements, so as to use them as grounds (reasons) for making choices

This kind of emphasis, although not quite so explicit, can be found already in Shulman's (1987) model of instructional reasoning. Reasoning concerns mainly the organization of instructional activities and focuses on content-related and pedagogical matters (Shulman, 1987; see also Hashweh, 2013; Orton, 1997; Rosiek, 2003). The *instructional core* is expressed already in Shulman's (1987) Anglo-American model of pedagogical content knowledge, but can be clarified further with the help of European formulations of the so-called *Didactical Triangle* (Kansanen & Meri, 1999; Zierer, 2015). The instructional core presents the essential "stakeholders" of the instructional process – teachers, students, and curricular substance – as well as the relationships between them (Kansanen & Meri, 1999;

Zierer, 2015). The instructional core illuminates where sources of improvement in teaching can be found, and the model can be used as a practical tool to organize professional development programs in schools (City et al., 2009; Loughland & Nguyen, 2016), as well as in teacher education (Stenberg et al., 2014; Toom et al., 2019). Applications of the instructional core or similar models also have been used to map out features of teachers' professional identity in both in-service and pre-service contexts (Beijaard et al., 2000; Stenberg et al., 2014).

The instructional core is particularly promising for purposes of the present thesis because it helps focus on the essential core elements in examining teaching dynamics. The instructional core also can be used as a whole to make sense of teacher knowledge; therefore, it has the potential to reveal the dynamic qualities in instructional reasoning because the relationships between the core factors can be examined. Both teaching approaches (Fenstermacher & Soltis, 2009; Fives et al., 2015) and instructional reasoning (Kavanagh et al., 2020) can be characterized as enormously complex. The instructional core helps make sense of this complexity, and in this way elaborates on a dynamic framework of instructional reasoning further. Instructional reasoning has been used to demonstrate how teachers balance their actions in their particular teaching contexts (Gholami & Husu, 2010), and a special use has been suggested in practice-based teacher education settings (Kavanagh et al., 2020). In this present thesis, I aim to bridge the gap particularly between instructional reasoning and two recently used and influential teacher knowledge constructs that I view as holding special practice-based potential: causal analysis of teaching (e.g., Hiebert et al., 2007) and teacher dispositions (e.g., Blömeke et al., 2015).

1.3 Research questions and the structure of the thesis

The present thesis aims to elucidate the essential dynamic qualities embedded in teaching practice. The following research question was designed to guide the thesis: How do teaching dynamics function in teaching practice?

The research question can be divided further into three sub-questions:

1) How do teaching dynamics function in teaching approaches, i.e., what are teaching approaches' essential dynamic qualities?
2) How do teaching dynamics function in instructional reasoning, i.e., what are instructional reasoning's essential dynamic qualities?
3) How are teaching dynamics integrated into teaching practice?

The aim and research questions in this Summary part of the thesis cover the thesis with its all three part-studies as a whole. The summary's goal is to synthesize the three part-studies' key findings theoretically and present their mutual links, as well

as their overall contributions to teaching and teacher education scholarship. Therefore, I do not unnecessarily repeat the original part-studies' structures, but rather reinterpret them from the perspective of their joint leading idea: the dynamic mechanisms in play in teaching practice. As an exception, the data sets and their analyses used in the original part-studies are reviewed separately in Chapter 2. In other respects, I attempt to describe the theoretical starting points, methodological choices, and key findings in a synthesizing manner by covering the research as a totality. I also focus on theoretical developments and relations between the part-studies and how they contribute to the idea of teaching dynamics together. Finally, in the final chapter, I discuss the implications of teaching dynamics, both from theoretical and practical perspectives.

I also avoid strict distinctions between theoretical and empirical materials so that the key message is conveyed as clearly as possible. This is particularly the case in Chapter 3, in which my results are discussed, and the teaching-dynamics system is presented. The theoretical framework introduced in that chapter combines the relevant conceptual and empirical insights of the thesis as a whole. Moreover, the chapter aims to present not only a theoretical, but also a practical teaching-dynamics framework, in which practical needs and implications from the results are related to previous teaching and teacher education literature. The results' contributions are examined in light of critical questions and problems uncovered in previous research. The Summary part's structure is illustrated in Table 1 below.

Table 1. Structure of the summary part of the thesis and its theoretical synthesis.

Research question	Part-study and data set	Key findings: The six teaching dynamics and the respective subsection in Chapter 3
1. How do teaching dynamics function in teaching approaches?	I. video observation of five in-service teachers	• Direct-Constructivist dynamic (3.1.1) • Method-Technique dynamic (3.1.2)
	II. thematic interviews with five in-service teachers	• Direct-Constructivist dynamic (3.1.1)
	III. stimulated-recall interviews with 45 student teachers	• Direct-Constructivist dynamic (3.1.1)
2. How do teaching dynamics function in instructional reasoning?	II. thematic interviews with five in-service teachers	• Instructional Core dynamics (3.2.1) • Dispositional Intention-Attention dynamic (3.2.2)
	III: stimulated-recall interviews with 45 student teachers	• Instructional Core dynamics (3.2.1)
3. How are teaching dynamics integrated into teaching practice?	I: video observation of five in-service teachers	• Four Teaching Dimensions – Dynamics of Choice (3.3.1)
	II: thematic interviews with five in-service teachers	• Four Teaching Dimensions – Dynamics of Choice (3.3.1)
	III: stimulated-recall interviews with 45 student teachers	• Learning-to-Teach dynamics (3.3.2)

Table I's first column provides the three research questions. The second column contains the specific part-studies (I–III) that examine each of the research questions and also indicates the method and data sets used in each part-study (described in more detail in Chapter 2). Finally, the third column summarizes the teaching-dynamics system presented in the Results chapter of the thesis (Chapter 3). The column illustrates the division of teaching dynamics with regard to the three main domains and the respective research questions (teaching approaches, instructional reasoning, and integration of the two), as well as the further split into six sub-dynamics. The Results chapter is organized according to the six dynamics provided in Table 1. The numbers in parentheses indicate the sections in Chapter 3 where each of the dynamic teaching qualities is presented in turn.

2 Method: Uncovering Teaching Dynamics

In this chapter, I explain the methodological approach applied in the thesis, starting from my general research approach and proceeding to the description of the data, methods, and data analysis. Finally, I reflect on the study's ethical choices and qualitative rigor, focusing mainly on the methodological approach of the thesis as a whole, as well as on the special perspectives and ways of working in this thesis.

2.1 Qualitative Research Design and Conceptual Generalization

A qualitative research design was adopted in the empirical conduct of the thesis. Considering that the aim was to uncover the critical dynamic qualities embedded in teaching approaches and instructional reasoning, it seemed sensible to use a qualitative research approach in which the various kinds of qualities of entities and processes, as well as their meanings, are *interpretatively explored,* rather than experimentally measured (Denzin & Lincoln, 2011). Qualitative researchers usually do this by using direct and subjective participation to a research site and to the activity examined (Denzin & Lincoln, 2011) – in my case, teaching practice. Also, it is clear that for the qualitative researcher, the research site needs to be a naturalistic one – a context or setting in which the studied phenomenon or activity would occur even without the presence of research activity (Lincoln & Guba, 1985). Myriad empirical materials are used as sources for active interpretation and are selected so that the examined aspect of the world can be made visible as efficiently as possible (Denzin & Lincoln, 2011). Such sense-making and making aspects visible are pursued through thick descriptions in which the constraints of everyday life are present naturally and can be described (Denzin & Lincoln, 2011). This approach fits well with teachers' practical knowledge research paradigm adopted in the present study (for a detailed review of teachers' practical knowledge as one of the major research paradigms in teacher education, see Rosiek & Gleason, 2017).

An excellent example of this kind of approach applied in the study of teachers and teaching is a study by Kennedy (2006), who used observational records

(including video-recordings) and teacher interviews, combining them to make sense of classroom life and teachers' thinking embedded in their everyday work. In my study – through the progressive set of the three part-studies – I attempted to adopt a very similar kind of approach. The idea of getting "Inside Teaching," as the title of Kennedy's (2006) study terms it, accurately captures what I also have been trying to do. This getting-inside aspect has been viewed as critical within teachers' practical knowledge research paradigm (Clandinin & Husu, 2019) and typically requires some kind of "talks to teachers" (Berliner & Rosenshine, 1987) so that "the wisdom of practice" (Shulman, 2004) can be captured and unraveled (see also Rosiek & Gleason, 2017). These expressions refer to getting a grasp of teachers' own insider view of their unique practice (Clandinin & Husu, 2019; Rosiek & Gleason, 2017), which often is best done through qualitative materials in which capturing the participant's perspective is emphasized (Denzin & Lincoln, 2011).

Although qualitative research often is associated with philosophical frameworks of anti-realism, such as philosophical constructivism or pragmatism (e.g., Denzin & Lincoln, 2011), I agree with the view that some versions of philosophical realism (see, e.g., Carr, 2003; Cobern & Loving, 2008; Holma & Hyytinen, 2015) are probably the most warranted philosophical stances on the differing varieties of educational research (for a detailed review of philosophy of research on teaching and teacher education including constructivist perspectives, see Rosiek & Gleason, 2017; for a detailed defense of philosophical realism in action-oriented educational research settings, see Pring, 2015). In my view, many of the "practical bearings" (cf. Capps, 2019) of educational practice and research into it are illustrated lucidly by socio-constructivist and pragmatist stances (such as those in my description at the beginning of this section; for more details, see also Melasalmi, 2018; Männikkö, 2019). However, I wonder to what extent these methodological notions should be really taken as literal *philosophical* positions. Here, I would lean more toward common-sense realism. After separating three meanings of "common sense" and rejecting the impressionistic use of the notion, Pring (2015, p. 105; italics and brackets added) defended the proper philosophical notion in educational research and concluded: "…these theoretical accounts (of educational research) cannot run too far away from the second meaning of common sense, namely, *the necessary and basic framework of ideas about the physical, personal, and social worlds in which we live*." I agree with this formulation and, in many ways, view this stance as very practical as well.

The phenomenological aims of qualitative research can be understood in realist terms in which relevant features of social reality are examined (Pring, 2015). Interpretive functions of educational research can be embedded in the framework of realist epistemology and hermeneutics, but the possibilities of multiple *interpretations* do not logically lead to multiple *realities*, as hermeneutics combined

with constructivist epistemologies would claim (Siljander, 2011; see also Pring, 2015). Puolimatka (2002) argues that subjective participation within social settings in qualitative research is a matter of research aims and suitable procedures that should not be confused with anti-realist philosophical stances, as they are not logically connected. In other words, a realist may interpret qualitative inquiry's value as how it potentially enables – rather than hinders – a researcher's efforts to get in touch with subjective features of social reality (Puolimatka, 2002; see also Pring, 2015).

More recent versions of constructivist teaching and teacher education research accounts also are available (Rosiek & Gleason, 2017), one of which is Barad's (2007) comprehensive philosophy of *agential realism* (Rosiek & Gleason, 2017). I would assert that despite "realism" being part of this term's name, it is obviously also a version of philosophical constructivism because of the "agential" attribute and how it is used. The main idea is communicated clearly: Barad wants to replace the notions of *interaction* and *representation* with *(agential) entanglement* and *performativity* in dealing with practical action (Barad, 2007; see also Rosiek & Gleason, 2017). Three important emphases in Barad's (2007) account dovetail with my work's perspective: The *dynamic* nature of practical action is emphasized, as are the following two principles: *uncertainty* and *complementarity*. These are, in a way, key starting points for the present thesis. Also, the performative aspects of educational research can be demonstrated with the help of the agential realist account, which I view as coming close to the "practical bearings" descriptions I touched on in the previous paragraph. I think that the strength of constructivist or pragmatist accounts, agential realism included, lies in that they often succeed in demonstrating some key elements in *the processes of learning and inquiry* (for a detailed view on educational research from the perspective of pragmatist philosophy, see Biesta & Burbules, 2003).

Taken as a literal philosophical account, agential realism probably faces some of the challenges mentioned in previous paragraphs, mostly with regard to common sense. Also, Harman (2016) suggests that agential realism, while appropriately attempting to avoid what he terms reductivist "undermining," actually might end up becoming constructivist "overmining," i.e., the phenomena *beyond* the intra-active entanglement, as individual things, beings, and agencies as such are lost in the treatment. Furthermore, Holma's (2004) philosophical concept of *plurealism* synthesizes Schefflerian realism and Goodmanian constructivism, which might be one non-reductionist way to characterize educational practice – and the object of educational research – meaningfully. Educational practice may well embody several mutually irreducible levels of reality, and they can still be real in the sense of mind independence (Holma, 2004). When reflecting on the philosophical review by Rosiek and Gleason (2017), my account attempts to provide, to a certain degree at

least, a *representationalist* account of teaching dynamics. My challenge may be not to lose the "practical bearings" somewhere in the halfway. The present theory construction's aim is mostly to form a practical framework that can be used to demonstrate teaching in a dynamic manner.

I wish to discuss two related specifications concerning my qualitative approach: The first concerns the idea of case and case study, and the second concerns the nature and conditions of generalization. Due to the qualitative thinking described above, a qualitative researcher often is interested in cases and the case-based logic of inference (Stake, 1995). I think that this case-based thinking can be contrasted with sample-based thinking in quantitative research, in which large representative samples are used to elicit generalizations to a population through statistical inference. A qualitative researcher is interested in individual cases and what can be learned from them. This qualitative logic is common in biographies: People can and do learn important things from individual stories and life histories. However, it should be noted that logic does not change in so-called multiple case studies: Even if more than one case exists, they still are individual cases in the sense that statistical generalization is not possible and is not, of course, even an aim in the first place.

The curious point I wish to make is this. In some sense, I am not so much interested even in cases in my work. I am more interested in the lived experience, or more accurately, the *phenomenon* under study (cf. van Manen, 1997), but with an emphasis on conceptualization of the general qualities in teaching experience. In my case, this phenomenon is teaching dynamics. To borrow an expression from Hiebert and Morris (2012), my focus is on teaching, rather than on teachers. The qualitative data are used to make sense of the dynamics embedded in teaching practice, and my goal is not to paint portraits of individual teachers, as interesting as they might be in their own right. Some of the part-studies (particularly Study I) more closely follow case study logic, whereas the others less so. Even in Study I, it was emphasized that the cases were used to categorize the phenomenon's qualities (teaching approaches), not people (teachers). Therefore, my case studies are highly instrumental, rather than intrinsic (Stake, 1995), and at the time this was written, I even would prefer calling them "qualitative studies," rather than "case studies."

This attempt to classify a studied phenomenon's qualities, rather than profile people (cases in the sense of individual humans), can be viewed as resembling the characteristics of phenomenography (Marton & Booth, 1997), in which the interest lies in the description of the *qualitative variation* in some phenomenon. My work has some loose connections to phenomenographic features to the extent that I am interested specifically in the various different – opposite or at least dynamic – qualities in teaching approaches and instructional reasoning. Although not explicitly phenomenographic, the approach to characterizing a phenomenon's qualities was adopted by Toom et al. (2015), who analyzed eight student teachers' portfolio

writings, but presented the results in terms of general reflective patterns without profiling participating student teachers themselves. Similarly, Stenberg et al. (2014) worked with student teachers' practical theories by categorizing individual beliefs through the whole data set, although they then classified individual student teachers' personal practical theories.

The above point is related closely to the matter of generalization. To formulate an alternative to the statistical inference that quantitative researchers use, qualitative researchers often refer to naturalistic generalizations (Lincoln & Guba, 1985) that intend to describe how and when case studies' results can (or cannot) be generalized. I think that the logic simply could be called "case-based generalization." The idea is that by using purposive sampling and describing the cases' features and contextual surroundings, readers (and others) can assess critically whether the findings, based on the studied cases, can be extended to other contexts (Lincoln & Guba, 1985). I think that this also can be stated in less-technical terms so that the case *touches* or *concerns* readers to a higher or lesser degree (similar to how a biography can be interesting or uninteresting to someone, and in my view, this depends not only on contextual similarity, but also on many other factors). Considering that my focus is more general, I am not even basing the logic of generalization solely on case-based generalization, although it is a central part of my approach.

Although I have not been able to find much explicit literature on the topic, Simons (2014) briefly lists an alternative way to think about generalization in case studies. She terms the alternative *conceptual generalization* and explains the logic this way: "It is the concept that generalizes, not the specific content or context" (2014, p. 466). I think this largely resembles what is done using the philosophical method. Philosophers, by combining general and implicit experience and forming concepts that make sense of it, can generalize to all relevant cases (Rosenberg, 1996). Through philosophical analysis, it is possible to define concepts (e.g., the concept of teaching) by defining their necessary and sufficient conditions. When this is done, the results apply and generalize necessarily, and this is practical because carefully defined concepts help make sense of teaching practice in changing contexts (Pring, 2015). Practicality is increased further because the analysis can be linked to normative conclusions (Carr, 2003) that are needed because teaching practice is, by nature, normative (Kansanen et al., 2000). However, it should be noted that this kind of conceptual generalization is only one way to pursue generalization. In addition to *necessities*, both *possibilities* and *probabilities* can be described as generalizable. The last two are actually much more established uses of generalization in empirical, also qualitatively oriented, educational research. Also, I view this as a matter of degree: In my approach, the degree of conceptual necessity in the analytical process is relatively high in relation to empirical possibilities, although I largely have been working in the context of the latter.

The conceptual generalization approach in qualitative research also can be understood so that philosophical and empirical forms of inquiry are combined (cf. Husu, 2004; Holma & Hyytinen, 2015). This is recommended by Richardson and Fenstermacher (2001) who, for example, utilized the Aristotelian conceptualization of practical reasoning to make sense of teacher thinking. To some extent, this is done in all empirical research because the data cannot make sense without concepts, and if new phenomena are discovered, the need for new concepts arises. In Study II, we also described this approach in terms of the *cultural role of research* (Biesta, 2004). Biesta explains the approach so that the results need not be grounded in empirical data alone, but that empirical research can be used to demonstrate what certain phenomena look like when they are examined through specific theoretical lenses and conceptual frameworks. In my studies, through this approach, I have tried to use and develop conceptualizations that would be as general as possible, and not limited to a narrow selection of cases. In this summary section of my thesis, I have attempted to synthesize the results from the individual part-studies further so that an even more general – and practical – picture of teaching dynamics could be portrayed. The approach also aligns with phenomenology that focuses on conceptualization of experience (van Manen, 1997), and this experience, I suppose, can be viewed as including both systematic empirical data, as well as overall human experience. In fact, some methodologists, such as Denzin and Lincoln (2011), have included phenomenology in their list of qualitative methods. This also comes close to the view that even a teacher's reflection of their own practice can be viewed as one kind of qualitative research (Kansanen, 2004).

2.2 Research Context

The empirical parts of the thesis were conducted in the Finnish context of a) school teaching and b) teacher education. The Finnish teaching and teacher education context is exceptional by international standards in two ways. First, in the Finnish school system, teachers have broad pedagogical freedom and autonomy (Toom & Husu, 2012). The schools follow the Finnish National Core Curriculum (2004 and 2014, during the time of data collection), and within these boundaries, teachers have much freedom to make their own decisions and judgments regarding their teaching. Moreover, teachers play a key role in the curriculum reforms that usually take place once per decade (Salonen-Hakomäki et al., 2016). Due to teachers' broad professional autonomy, the Finnish school system offers an appropriate context for examining teaching dynamics: enactment of different teaching approaches and the teacher reasoning behind it.

Second, the Finnish teacher education system comprises university-based degree programs in which teachers working at the primary level and above have master's

degrees that include research studies (Tirri, 2014). This academic education is meant to equip teachers with research skills viewed as contributing to teachers' reflective capacity and instructional reasoning. At the core of teacher education programs is the idea of a "double-practicum," in which student teachers engage in both teaching and research practicums (Toom et al., 2010). Research practicums mainly comprise thesis studies (bachelor's and master's degrees), but usually include also other more minor research courses, such as different kinds of workshops. Teaching practicums are conducted at university-based teacher training schools (i.e., normal schools) that also function as intensive research sites. Both schoolteachers and academic teachers and researchers supervise student teachers.

The empirical materials comprise three data sets that include both in-service and pre-service teachers' observations and interviews.

2.3 Data Gathering: the three data sets

Teachers and student teachers from two schools participated in this study. The schools were located in two separate municipalities in the southwest region of Finland and were of average size by Finnish standards. One of the schools was an ordinary field school, and one was a university-based teacher training school. They both followed the National Core Curriculum.

The empirical data comprised three sets, each of which was used in one part-study. The logic between the data sets is that the study focus proceeds from observations of teacher actions (*Study I*) to teacher thinking (*Study II*) and finally combining teacher actions and thought (*Study III*) (Clark & Peterson, 1986; see also Gitomer & Zisk, 2015; Loughran, 2019). The three data sets are described below:

1. Teacher action level: 15 video-recorded lesson videos of five primary schoolteachers, two working at the field school and three at the teacher training school (Study I)
2. Teacher thinking level: thematic interviews with the same five primary schoolteachers (Study II)
3. Combining teacher action and thinking: Stimulated-recall interviews were conducted with 45 student teachers who were at different stages of their university studies while participating in different teaching practicums at the teacher training school (Study III).

The first two data sets were situated in the context of in-service school teaching. The third set lied within a pre-service teaching context. Following the general logic explained in Chapter 1, I mainly examined teaching and teacher education as an extended phenomenon; therefore, I mostly did not structure the results according to a specific data set, but rather according to the parts of the phenomenon, which also

is implied by the research aim and research questions. However, some parts of the phenomenon relate more to a certain kind of data. This is the case, for example, with my analysis of learning-to-teach dynamics, which I found to be the most meaningful to examine in Study III's data set. Even then, the aim is a theorization that can be used to make sense of teacher learning, principally across changing contexts. For example, with teaching approaches, all three data sets were used, albeit possibly with different types of emphases.

2.3.1 First data set: video observations of five in-service teachers (*Study I*)

We worked with the five primary schoolteachers and video-observed their teaching so that ultimately, three lesson videos per teacher were selected for further analysis. The videos were selected so that they represented similar school subjects and typical lessons for each teacher, namely mathematics, science, and native language teaching. These three subjects are predominant in the weekly schedule of primary classrooms, with mathematics and Finnish often viewed as the central basis for students' future learning. The variety of content is typical of teachers working at a primary level, and for this reason, we wanted to include different school subjects. At the beginning of the data collection process, two of the authors video-recorded the lessons together, allowing both researchers to familiarize themselves with each research site and take field notes. Later, a single researcher video-recorded some lessons, allowing for extensive collection of teaching actions. The advantages of using video recording lie in the density and permanence of the data gathered (Powell et al., 2003). Recordings also help overcome difficulties with live observation, particularly the challenges of noticing the characteristics of instructional actions in a classroom setting.

2.3.2 Second data set: thematic interviews with five in-service teachers (*Study II*)

We also conducted thematic interviews with the same five primary teachers, forming the second data set, which was used in Study II. Thematic interviews were conducted with each teacher in their own classrooms, adopting a modified version of the interview scheme from the *Teachers Pedagogical Philosophy Interview* (cf. Savasci & Berlin, 2012). To get at teachers' instructional reasoning behind their teaching approaches, the questions were related to teachers' views and ways of organizing their teaching. We used an active interview style (Holstein & Gubrium, 2004) to deepen our grasp of teachers' accounts and asked follow-up questions wherever appropriate. Following the general research approach taken in this thesis, this meant that a rather informal, open, and discussion-oriented approach was adopted during

the interview process. Furthermore, interviewer participation was not avoided – quite the contrary, as this allowed for using the previously described qualitative approach of situating the researcher as an "observer in the world" (Denzin & Lincoln, 2011, p. 3). During the interviews, the teachers often spontaneously offered practical examples of their teaching, even without an interviewer prompt. For example, teachers might refer to their teaching approaches by pointing out students' project work hanging on the classroom wall, or by showing the interviewer their evaluation templates.

We worked with the five teachers for a somewhat prolonged period of time so that the teachers also were observed during lessons that were not included in the final systematically analyzed materials. This prolonged engagement allowed for familiarization with research sites and contextual surroundings to help make sense of teacher interviews and observational records within the broader context.

2.3.3 Third data set: stimulated-recall interviews with 45 student teachers (*Study III*)

The third data set, used in Study III, comprised 45 student teachers' (pre-service teachers') critical teaching incidents (f = 90), which were video-recorded and selected during the student teachers' teaching practicums, as well as the stimulated-recall (STR) interviews (Calderhead, 1981) related to the critical incidents. The data collection implemented *the procedure of guided reflection* (e.g., Husu et al., 2008; Toom et al., 2015; Toom et al., 2019; see also Allas et al., 2017; Heikonen et al., 2017). The idea was to combine the two kinds of data – observational and interview-based – used in Studies I and II. The STR method aims to capture interactive thinking embedded in acting, representing a mode of the agent's moment-to-moment thinking (Calderhead, 1981). The student teacher (32 females and 13 males) were Finnish pre-service primary schoolteachers (n = 41) and pre-service subject teachers (n = 4). Some pre-service class teachers were minoring in subject studies, and all the participating pre-service subject teachers were minoring in primary schoolteacher studies. The student teachers were at different points in their studies (bachelor's and master's programs) in the contexts of their specific practicum curricula. For the video recordings, the participating student teachers were instructed to choose a lesson that coincided with their own learning goals as teachers. Thereafter, the student teachers were asked to select two incidents – one empowering and one challenging – from the video-recorded lessons. The critical incidents then were reflected on with supervisors and/or peers in STR interviews, following a discussion template.

2.4 Data Analysis

The analysis took place through a qualitative content analysis (Miles et al., 2014), following the abductive approach (Timmermans & Tavory, 2012). Intentional interaction between the data and theoretical constructs was created to conceptualize phenomena in the part-studies further. The emphasis between the data- and theory-driven approaches varied, in that the analysis conducted in Study I was the most theory-driven one, whereas Studies II and III employed more data-driven approaches. A data-driven analysis is essentially the same as a grounded theory procedure (Glaser & Strauss, 2006). Following Thornberg (2012), my implementation of abductive analysis represents "informed grounded theory." As researchers draw on pre-existing concepts available to them, this type of data analysis utilizes these concepts, which are modified and fit with the data as the analysis proceeds (Thornberg, 2012).

Overall, the analysis utilized the three qualitative mechanisms explained by Miles et al. (2014) that are intertwined and feed each other: *data reduction (or data condensation)* and *data display* that then facilitate *conclusion drawing and verification*. Data reduction refers to how complex, authentic, and relatively unstructured data were processed interpretatively into a category system that presents the data's meaning in a systematic, condensed form. Such an analysis requires data displays in which analytical processes are visualized in different ways, e.g., by using coding templates. The qualitative interpretations often are quantified, with the numerical representation of categories used to draw and display conclusions during later analytical stages (Maxwell, 2010).

Practically speaking, the main analytical stages comprise two subsequent procedures: *unitizing* (or *segmenting*) and *coding* (Mena & Clarke, 2015). Unitizing refers to the use and nature of different kinds of coding units, which are pieces of data that then are coded. Clarification of coding units is important because the data can be unitized in many different ways that then carry implications when conducting analyses and interpreting results. Coding entails categorization of the formed units, i.e., attaching meaning to them. In my work, the coding followed the practice of content analysis, and categorization was based mainly on the coded content's meaning, but sometimes also on structural qualities. The nature of coding units and their categorization varied between the part-studies because of differences in data types, as well as study purposes. Unitizing and categorization (coding) in each of the part-studies are described below.

2.4.1 Analysis of video-observation data (*Study I*)

The coding units used in the analysis were lesson episodes that comprised instructional activities that could be separated and that followed each other.

Unitizing entailed screening out lesson episodes that included constructivist teaching practices, then isolating the specific sequence, including one or several constructivist practices. In some cases, the lesson episode (e.g., teacher presentation, group work, and individual task) as a whole included constructivist practices, whereas in other cases, a specific sequence within the broader episode manifested constructivist practice. In both cases, the instructional activity (constructivist practice) was the definitive coding unit, although the information from the broader episode also was marked to the coding table.

Coding followed a theory-driven coding scheme comprising the four main categories of constructivist teaching (use of knowledge-structuring activities, exercise of student autonomy, organization of authentic learning environments, and organization of problem-oriented learning activities) and individual constructivist practices as subcategories. A brief description of an episode during which a constructivist practice was identified was marked on the coding table. Each main category and its respective practices were coded in conjunction with the instructional episode. A description of the coded episode was written, along with each episode's time and duration. This allowed for use of data quantification (Maxwell, 2010; Miles et al., 2014), so that the constructivist practices' overall durations were counted.

The main coding categories and related practices were not viewed as mutually exclusive, but rather potentially complementary, so that all interpretations of each episode were included in the analysis. Any particular dimension's duration was based on the time assigned to each associated practice. Because several practices could appear simultaneously, the total time for each dimension comprised the sum of single practices (e.g., if three practices involving student autonomy were assigned within the same 10 minutes, that would result in 30 minutes of student autonomy). Accordingly, the total time for constructivist teaching comprised the sum of all dimensions. The percentages for each of the four dimensions and their respective practices then were calculated, with reference to this accumulated total time duration.

2.4.2 Analysis of thematic interview data (*Study II*)

Unitizing in Study II comprised two major parts: individual instructional reasons as coding units during Stage 1, and more comprehensive practical theories comprising several instructional reasons during Stage 2. To confine the mapping of teachers' instructional reasoning, all teacher talk concerning instructional choices within teaching approaches was extracted from the interview data. First, topical coding units (Mena & Clarke, 2015) were used to categorize individual instructional reasons, with the unit size ranging from a few words to a paragraph. Unit size was determined by changes in coding categories (Husu, 2005). Altogether, the analysis yielded 585 instructional reason units. After the analytical Stage 1, the data were reduced to two

alternative displays: one that showed only instructional reasons and another that showed the whole interview discourse. To construct more comprehensive practical theories of teaching, we collated all instructional reasons related to the same instructional choice, which was Stage 2. The coding during both stages is described below.

During Stage 1, individual instructional reasons relating to instructional choices were coded as *affordances*, *constraints,* or *qualifiers,* depending on whether they were viewed as affording or constraining a given choice within the teaching approach. Reasons then were coded in relation to the instructional core's elements *(teacher, student, substance,* and *context*). A constant data-grounded comparison was used to construct more accurate categories inside each instructional core element (Timmermans & Tavory, 2012). This phase yielded five subcategories under each of the four instructional core elements (totaling 20 subcategories of instructional reasons).

During Stage 2, practical theories then were separated from each other, and choices that the teachers discussed were linked to each practical theory. Altogether, 65 practical theories were extracted, and each practical theory was assigned a code, indicating which instructional choice it represented. Here, we also consulted the parts of the discourse that were not viewed as instructional reasons. If the individual reasons in a PT related to multiple instructional choices, the practical theory was assigned to the most prominent of these. To uncover practical theories' essential characteristics, we compared them according to their choices, reasoning complexity, and teacher dispositions, i.e., how practical theories represented different instructional reasons and their role in orienting teachers' performances in classrooms.

2.4.3 Analysis of stimulated-recall data (*Study III*)

In Study III, we used the most holistic coding units (cf. Miles et al., 2014) to allow researchers to create an overall picture of the data (Miles et al., 2014). The coding units were critical incidents, i.e., meaningful lesson incidents that the student teachers selected from the lessons, which then were brought up for supervisory discussion (STR interviews). To identify the student teachers' teaching approaches, we treated each critical teaching incident (f = 90) as a single unit of analysis. To recognize the student teachers' teacher intentions and self-perceived instructional impact, we interpreted each transcribed STR interview (f = 90) as a whole, enabling us to apply multidimensional simultaneous coding (Saldaña, 2009), whereby each of the 90 critical teaching incidents was categorized from the three perspectives presented in the learning-to-teach (LTT) framework: teaching approaches; teacher intentions; and self-perceived instructional impact.

Coding was conducted using abductive content analysis (Timmermans & Tavory, 2012), in which theory-driven coding categories were adopted, but the categories were modified to fit the data. The coding was based on the transcribed STR interviews, and the lesson videos also were consulted to identify student teachers' teaching approaches. Following the logic of our LTT framework and the research questions, the coding proceeded in two major stages. We first categorized the individual LTT domains, then examined the comprehensive LTT patterns by linking the LTT domains together.

In the coding of the LTT domains, we modified and applied Pitkäniemi's (2009) model to teaching approaches (critical incidents) and Kennedy's (2016) model to teacher intentions (STR data). Kennedy's (2016) model of teacher intentions then was modified based on our data so that *portraying curriculum* and *exposing student thinking* were integrated into a single coding category (we interpreted *exposing student thinking* as being part of the larger category, *portraying curriculum*). Hiebert et al.'s (2007) model and the instructional core (e.g., Toom et al., 2019) then were used to assess instructional impact (STR data). Next, summary matrices were created to relate teaching approaches, intentions, and perceived impacts with each other (Miles et al., 2014). With the help of the summary matrices, we analyzed what kinds of LTT patterns were emphasized in the data, i.e., what kinds of teaching approaches were associated most frequently with particular teacher intentions and self-perceived instructional impacts. Finally, more data-driven categories were constructed within each LTT pattern, thereby characterizing the LTT patterns' critical qualities in more detail.

2.5 Ethical considerations and qualitative rigor

As for ethical decisions made during this qualitative project, the three following principles were considered: minimizing harm; respecting participants' autonomy; and respecting their privacy (Traianou, 2014). The harm that research participants experienced was minimized mostly by treating each participating teacher with dignity and respect. The teachers could decide the most appropriate times and lessons for observations and interviews. In Studies I and III, which included lesson observations, teachers could cancel scheduled video observations if they wished to do so. In Study III, the student teachers could suggest the most appropriate lessons for video-recording on the basis of their goals and convenience, and then, together with their supervisors and/or peers, could suggest suitable times for stimulated-recall interviews within the recommended time frame that researchers provided.

The researchers were sincerely interested in teachers' views, practices, and experiences during data collection, and in many cases, they became rather familiar with the participants during prolonged engagement in the research sites. Because the

participants could affect data collection times and contexts greatly, they were free to exclude, for example, particularly stressful moments from their teaching practice from the data collection. Within the interviews' conduct, the interaction setting was designed to be as supportive as possible, and the interview participants were encouraged to express their views freely. In the Study II interviews, it was emphasized to the teachers that we were interested in their present views on teaching that could change later.

In my estimation, the student teachers and their supervisors experienced the most challenging moments during data collection for Study III. Student teachers often view practicum periods as challenging, even without participating in research. Participation in the guided video-assisted reflection process was a new experience for both the student teachers and their supervisors. The student teachers were guided through intensive reflections on their video-recorded practices, and the supervisors gave their time and effort to get guidance on these reflections. However, the experiences reported to the researchers mainly were highly positive, although often exciting and challenging in a constructive way. During the interviews for Studies II and III, the participants usually reported that the interviews helped them organize their thoughts and provided a rare setting in which they can reflect on their teaching systematically. The observations focused on teachers' actions in the classroom, though individual pupils were not studied. The observations took place in natural classroom settings without specific interventions in children's daily routines, so any possible harm that the children experienced can be viewed as minimal.

The participants' autonomy was respected by informing them of the purposes of the research and ensuring voluntary participation. The teachers in Studies I and II were contacted with the cooperation of the two schools' principals. The five in-service teachers participated voluntarily in observations and interviews, and provided oral consent to participate.

For Study III, the student teachers and their supervisors were informed about the data collection during conferences and were told that student teachers could participate in the project as part of their teaching practicum if they wished to do so. The participating student teachers provided informed consent. Considering that the university-based teacher training school is research-intensive, the children's parents in Study I were not asked for individual permission to allow their children to participate, but rather the teachers informed researchers on whether certain students in their class could not be included in lesson observations. The pupils' parents at the field school were informed about the research and were asked for consent. In Study III, the teachers at the teacher training school were provided with consent forms for the pupils' parents, and if deemed necessary, informed consent was sought from the parents. In Studies I and II, in which lessons were video-recorded, no personal information or any other data were collected from the pupils, and neither were they

studied as research subjects. Their views or behaviors were not coded in the analysis either. The focus was on teachers' classroom activities and interactions from teachers' perspectives, and pupils were included in observations merely as part of naturally occurring classroom interactions.

Participating teachers' privacy was guarded by using anonymous codes or initials in the data storing and analysis templates. Accordingly, their identities were anonymized in the research publications by using codes so that they could not be identified. We also used the data examples in publications so that identification of individual teachers was very unlikely. However, the teachers themselves, close colleagues, or peer student teachers, as well as the research team's members, possibly could identify some of the teachers. I did not view this as highly problematic because the participating teachers often knew about each other's participation already before and during data collection, and it was not perceived as negative – quite the contrary. It is not possible to recognize individual pupils from the research publications. The data were stored on personal computers, external hard drives, and university-based web archives, which were not available to outsiders.

I ensured that the qualitative studies' rigor was based on triangulation processes (Lincoln & Guba, 1985). The notions of reliability and validity often have been called into question in qualitative research because statistical measures used in quantitative studies cannot be employed. Concepts such as investigative validity (Saldaña, 2009) and craft knowledge (Kvale, 1995) have been used to illustrate subjective and process-like features of qualitative analysis. Thus, reliability and validity measures have been replaced, for example, by trustworthiness, along with specific criteria to assess it (Lincoln & Guba, 1985). However, Morse (2015) suggests reclaiming the notions of reliability and validity in qualitative research because they are understood more widely in social science communities, and because trustworthiness criteria are rather difficult to apply and interpret in practice. I find the notion of trustworthiness suitable for my work in several ways, also, because it describes the practical functions and processes of qualitative research.

Morse (2015, 2018) calls her notion "rigor in qualitative inquiry," and it includes both reliability and validity. In addition to reclaiming, e.g., the need for reliability, the generalization requirement is also emphasized – contrary to some qualitative methodologists. I agree to some degree that the point of qualitative inquiry is to elicit insights that can be generalized to other settings. Explaining the various notions of qualitative validity, Lather (2007) spotlighted the reader as one possible detector of validity and transferability of results. Morse (2015) explained that due to the iterative process of qualitative data generation and analysis, which often are highly unstructured, quantitative measures – such as interrater reliability – are difficult to apply because qualitative analysis is based on *interpretative insight* that requires substantial theoretical expertise, as well as intimacy with entire data sets – both of

which develop during the ongoing analytical process (Morse, 2015). It is often difficult for a second coder to co-analyze the "soft" data because the second coder often cannot meet the aforementioned requirements (see also Morse, 2018).

In particular, three forms of triangulation were used in this work: methodological; researcher-based; and theoretical. As for methodological triangulation, the three studies employed different types of qualitative data to shed light on different aspects of the researched phenomenon (teaching dynamics). All three part-studies utilized researcher triangulation, in which the author team evaluated the emerging findings and generated conceptual ideas and categorizations together (Saldaña, 2009). Theoretical triangulation was used particularly in Study I, in which two different kinds of conceptualizations of the results were finally brought together (constructivist practices and method-technique classification). Also, in the synthesis of the three part-studies in this summary, part of the theoretical triangulation in this thesis is used by demonstrating how the studies and results can be linked together.

In Study I, two of the authors analyzed all 15 lessons together, which enabled the use of researcher triangulation to compare interpretations between the two analysts face-to-face (Saldaña, 2009). The researchers could pause a recorded lesson and evaluate it to ensure coding consistency during the various stages of interpretive data analysis in Study II, in which the first author performed the coding. Researcher triangulation was used, and throughout the analytical stages, the authors together developed the coding categories by engaging in constant discussions and sharing the coding sheet (Denzin, 1970; Saldaña, 2009). When the first author completed a specific phase's initial coding, the second and fourth authors joined him to evaluate the categories. The most challenging phases were analyzed with particular caution, mainly due to the categorizing of practical theories in which several category systems had to be tested before agreeing on the final ones. An agreement was achieved by testing several coding systems with the data, as well as considering the categories' theoretical coherence (cf. Morse, 2018). In seeking the rigor of the qualitative analysis in Study III, an approach that largely resembled that of Study II was taken. The data and coding template were shared between the authors to discuss the analytical choices. While the first author performed the coding, the coding categories were discussed within the author team. Furthermore, the category system's theoretical coherence was considered (Morse, 2018).

The analytical processes, conceptual theorization of the coding categories, and data examples were used to make the interpretations visible in all studies (Morse, 2018). Considering that the aim of the thesis was conceptual generalization of teaching dynamics, I viewed the interpretive insights and conceptualization of category systems as being important for generalization. It also should be noted that these conceptualizations remain open to criticism and further developments.

3 Results: Representing Teaching Dynamics

In this chapter, I present the teaching-dynamics system. Teaching dynamics are described in Sections 3.1 and 3.2 in terms of the two essential loci of teaching practice: enactment of teaching approaches and teachers' instructional reasoning. Both of these areas comprise two main dynamics and their respective sub-dynamics that are described in turn. Finally, Section 3.3 systematizes how teaching dynamics in teaching approaches and in instructional reasoning are integrated in two specific areas.

3.1 Teaching Dynamics in Teaching Approaches

Teaching dynamics in teaching approaches work in two ways. The first section describes options that teachers have when selecting teaching approaches. Of special interest here is the differing combinations that teaching approaches can form in teachers' actual classroom practice, which has been touched upon already in the first section. The second section presents a more thorough mechanism that explains why and how teaching approaches can combine elements from alternative teaching approaches presented in the first section.

3.1.1 Direct-Constructivist dynamic

As introduced in Chapter 1, one of the most basic questions in research on teaching approaches is: What are the alternatives, i.e., the different teaching approaches that teachers select from? Although dichotomous, I think certain merit can be found in the two-part splits of teaching approaches, when the alternatives are formulated accurately. Thus, there seems somehow to be "some two" approaches to teaching that portray critical differences in how students' study activities can be organized through teaching. The challenge is to conceptualize what these two approaches are. In my thesis, I have drawn on some of these classifications (Gage, 2009; Good & Lavigne, 2017; Pitkäniemi, 2009; Sato, 2014) and suggest that teaching approaches can be divided into two main categories: *direct teaching approaches* and

constructivist teaching approaches. These terms refer to a) practical organization of teaching-studying activities by the teacher (and as such make no reference to student learning, neither epistemological nor philosophical issues) that b) exclusively refer to teachers' observable behavior (rather than to their "focus" or other teachers' thought processes), are c) descriptive, and d) open up and make sense of the various combinations that the main approaches can form.

As for the first conditions (particularly a and b), we could say that when discussing teaching approaches from here on out, constructivism refers to what Terhart (2003) terms *constructivist didactics*. I apply similar logic to direct teaching approaches, although the concept of "direct" does not need similar analytical distinctions because it is not used in a wide variety of theoretical contexts as "constructivism." As explained in Chapter 1, my definitions of *teaching* and *teaching approaches* principally imply the broad notions of curricular substance worked on with students in classrooms. Therefore, my account does not, by any means, exclude, for example, the caring dimension of teaching. On the contrary, my conception of teaching dynamics explicitly deals with the notion of caring (see Section 3.3.2). However, my aim is to demonstrate where it belongs in the totality of teaching dynamics. Considering that my formulation of teaching approaches focuses exclusively on the classroom activity level, various ideals and broad purposes are not dealt with here, but rather in the context of reasoning, dispositions, and in the learning-to-teach notion.

The definitive factor in teaching approaches in my view is their *directness* in the organization of teaching-studying activities. In direct teaching, the teacher influences students' learning with considerable directness, whereas in constructivist teaching, this organization of study activities is considerably more indirect. Thus, constructivist teaching in my interpretation also could be labelled "indirect" teaching. However, I think that this is largely a matter of taste, i.e., the same thing is described in a different way. "Indirect teaching" is a negative way to frame the issue, describing more of what is not done within the teaching approach enactment than what is done. "Constructivist teaching" instead denotes more positively what is done: The teacher is viewed as offering input that mainly comprises providing "building blocks" that students are expected to incorporate into their studying. Also, I would find the notion of the facilitator approach by Fenstermacher and Soltis (2009) very suitable, particularly when focusing on their formulation's classroom activity elements. What this kind of two-part split enables, when the above conditions are satisfied, is a dynamic systematization of teaching approaches. Because the two basic alternatives are so different, they indicate where the dynamics in teaching approaches are located in the first place. Other dynamic qualities are based on combinations of these basic alternatives and are presented below based on the part-studies.

In Study I, we interpreted constructivist teaching practices based on teachers' video-recorded classroom activities. The major goal was to create an analytical

system that captures constructivist teaching so that it can be differentiated meaningfully from other kinds of teaching approaches – in this case, direct teaching. The results suggested that complexity definitely is in play when trying to interpret real-life teaching situations from the perspective of a constructivist teaching-direct teaching split. We noted that more than one dimension of constructivist teaching is needed that describes constructivist practices' various features. Constructivist teaching approaches were formulated to operate based on four main qualities, each comprising a cluster of teaching activities: *use of knowledge-structuring activities; exercise of student autonomy; organization of authentic learning environments;* and *organization of problem-oriented learning activities*.

The clear finding was the considerable variance in the aforementioned four qualities of constructivist teaching activities. Based on the cross-case analysis of five teachers' classroom activities, the variation in constructivist teaching approaches was due to the exercise of student autonomy. This category made the most difference so that the observed constructivist teaching approaches could be reduced to two main manifestations. The first implementation emphasized student autonomy. Either individual or collaborative student autonomy was present in constructivist teaching approaches and flavored the studied activities. The exercise of student autonomy often – but not always – also was linked with the organization of problem-oriented learning activities. In these cases, the classroom probably resembled mostly what is usually understood as constructivist teaching. The other manifestation occurred when the exercise of student autonomy was not emphasized in teaching activities. It could be said that somehow, the implementation of constructivist teaching was more moderate, but elements from the knowledge-structuring activities and authentic learning environments still could be present in these activities. In other words, when the teachers mainly were leading the study activities, acting as responsible agents in this sense, knowledge structuring and authentic elements still could occur.

Whereas in Study I, the dynamic qualities of teaching approaches were examined through separate categories of constructivist teaching, in Study III, the dynamics in teaching approaches were conceptualized slightly differently, using a coding system that explicitly includes both main forms of teaching approaches: direct teaching and constructivist teaching. We also made the categorization more dynamic, with Pitkäniemi's (2009) help, by incorporating two blended forms of teaching approaches, which are combinations of direct and constructivist approaches. The main approaches were conceptualized in terms of one-way direct teaching and one-way constructivist teaching. The combined approaches were termed *multi-way direct teaching* and *multi-way constructivist teaching* (Pitkäniemi (2009). The idea is that the one-way approaches present the "polar opposites" of teaching approaches – the most "pure" application of the main alternatives (direct and constructivist). The multi-way approaches blend practices from both main approaches to varying

degrees. When the emphasis is on the direct teaching approach, but also includes constructivist practices, the approach is multi-way direct teaching. However, when constructivist teaching is emphasized and still includes direct teaching practices, the approach is multi-way constructivist teaching. I modified the original conceptualization of Pitkäniemi (2009) for purposes of the present thesis. Pitkäniemi (2009) used the concepts from the teaching approaches' presentation and construction models, and I have conceptualized the teaching approaches slightly differently, as explained above. I also possibly did not place as much emphasis on social control of knowledge as a classification criterion as Pitkäniemi (2009) did, and instead elaborated the teaching approach framework from the perspective of general classroom interaction.

We employed this dynamic category system of one-way and multi-way approaches to student teachers' critical teaching incidents upon which they reflected. Study III found that the most-reflected-upon teaching approach during student teachers' practicum experiences was multi-way direct teaching. Student teachers tended to focus on direct teaching episodes in which they were leading classroom activities actively. What is interesting is that these direct teaching incidents most often were manifested in the interactive variant (multi-way), in which the student teachers led whole group classroom discussions and employed questioning techniques. This finding is important for future research, particularly from the perspective of student teachers' teaching approaches. Grossman (2018) has identified leading classroom dialogues as a central core teaching practice that should be coached and developed systematically during teacher education. It represents a very frequent implementation of direct teaching – and one of the most used options within the spectrum of teaching approaches (see e.g., Brophy, 2006). Furthermore, instead of highly demanding forms of comprehensive constructivist approaches, interactive classroom discourse might be one of the most realistic ways to develop in-depth comprehension and application of curricular substance in classroom contexts (Good & Lavigne, 2017). Therefore, multi-way direct teaching merits further examination, in which student teachers' classroom dialogues are analyzed and rehearsed thoroughly.

3.1.2 Method-Technique dynamic

To get a grasp of teaching approaches' dynamic qualities, I describe below how teaching approaches work so far:

1) in terms of basic alternatives: direct teaching and constructivist teaching (Study III)
2) within separate categories that include different kinds of instructional practices, even within the same broad teaching approach (Study I)

3) in combinations in which teaching approaches often blend practices (multi-way teaching approaches) from both basic alternatives (one-way teaching approaches) (Study III)

Although these three notions help make sense of teaching approaches' complexity in real-life classroom situations by adding some necessary nuance to the system of teaching approaches, the following questions remain: Can a constructivist teacher enact direct teaching practices? Can direct teaching include constructivist teaching practices? Although these questions can be viewed as too categorical or even naïve, they carry some crucial theoretical and practical relevance. Major debates on teaching approaches have culminated in this very problem (see, e.g., Brophy, 2006; Good & Lavigne, 2017; Kirschner et al., 2006). For example, it has been suggested that constructivist teaching approaches lack effective instructional mechanisms present in direct teaching approaches (Kirschner et al., 2006). This statement has been criticized in that constructivist teaching does not exclude direct instructional guidance that students often need (Schmidt et al., 2007). However, this response leaves the following questions unanswered: If constructivist approaches can or do include direct teaching elements, then what is the difference between these approaches (Sweller et al., 2007)? Is it not the point of constructivist approaches to reduce direct teacher input, thereby making space for the student to engage in meaningful construction of learning experiences? Is it not the whole point of various school reforms specifically to change prevailing "traditional" or "old-fashioned" school practices into something new (cf. Gage, 2009)?

However, questions from the opposite perspective also can be raised. In Study I, it was found that some observed teaching activities could be described in terms of both direct and constructivist teaching. Thus, it was possible that the two main teaching approaches might overlap. This was the case particularly when teachers – rather than students – were acting as the responsible agents in leading study activities, i.e., the exercise of student autonomy split the enacted teaching approaches into two main manifestations. A difference in constructivist teaching existed in which student autonomy was exercised greatly compared with those constructivist cases in which it was clearly less present. One of the earlier anonymous reviewers of Study I's manuscript paid careful attention to this and asked us:

"…I find a little problematic the expression 'constructivist-associated episodes' because constructivist teaching can include 'direct teaching' such as teachers' explanations of or stories related to the matters that students are studying. The main point is that students' processing of information is activated and supported, not that 'direct teaching' or 'lecturing' is totally missing. Still, I understand the point of this expression, and I do not have a suggestion how to address this point. I would be glad to see if the authors could find a solution."

The issue raised above fell within our focus in Study I. Some of the overlap was dealt with and applied in Study III by employing multi-way variants in the categorization of teaching approaches. As a reminder, two multi-way approaches – instead of only one intermediate (multi-way) category – were used in the coding system by following and modifying Pitkäniemi's (2009) conceptual developments, i.e., both direct teaching and constructivist teaching could manifest in the form of multi-way variants. The criterion differentiating between these two intermediate (multi-way) approaches was that of emphasis. When direct teaching was multi-way, direct teaching was emphasized, while the constructivist elements were playing a minor role in the teaching activity. When constructivist teaching was enacted through multi-way implementation, the sides changed, i.e., constructivist elements were emphasized, whereas direct teaching elements were repressed. But what does "emphasis" mean here? How does one see and decide in practice which one of the main approaches is emphasized and which one is not?

To address this issue, we suggested an explanatory mechanism in Study I that explains the aforementioned phenomenon of overlap in teaching approaches. This can be understood better in terms of *method-technique divide in teaching approaches*. Kansanen (2004) mentions the teaching method and teaching technique concepts, but he does not elaborate them to a great extent. In the present work, the divide is used to demonstrate that an additional element is incorporated into the conceptualization of teaching approaches. Teaching approach always includes two aspects that are like two sides of the same coin. One is the method aspect and the other is the technique aspect of the teaching approach. Under this framework, these aspects are necessary in the sense that teaching approaches cannot be analyzed sufficiently without making the distinction. The method aspect can be viewed as the macro-level aspect in a teaching approach, describing the overall organization of the teaching-studying activities in the classroom. For example, collaborative learning, teacher demonstration, and questioning method would count as teaching methods. The method aspect can be illustrated as follows: If one, as an outsider, enters a classroom in which a lesson is in progress, what is encountered first – within seconds – is the teaching approach's method aspect. The teaching method can be observed from the overall organization of the classroom, the main instructional equipment, the grouping of the students, the main activity or activities in progress, and the teacher's role. However, something more fine-grained also is present in teaching activity that usually cannot be noticed so quickly. Maybe the teacher is reacting to student initiatives, taking note of their prior conceptions, using specific kinds of questions, showing authentic materials to students as part of classroom activity, etc. These practices represent the micro-level aspect of teaching approach, i.e., they are smaller-scale actions enacted within the broader teaching method.

Thus, to address the overlap problem, i.e., whether constructivist teaching can include direct teaching elements and vice versa, we need to define the terms. Because teaching approach comprises two aspects – the method and the techniques – the terms *constructivist teaching* and *direct teaching* can be used either in the method sense or technique sense of the word. In this scenario, constructivist teaching can include direct teaching elements and vice versa, *but not in the method sense simultaneously*. Thus, either of the main approaches plays a role in the teaching method, but teaching practices from the opposite approach can be combined into the prevailing one in the form of teaching techniques. The overlap in this sense – combining direct teaching and constructivist teaching – can be explained through the method-technique divide within teaching approaches. The most dynamic cases in teaching approaches actually take place when the prevailing teaching method is enriched with teaching techniques derived from the opposite approach. Thus, the teaching approach as a whole forms a specific kind of configuration of teaching methods and techniques in each given case.

It should be noted that with one issue, it is partly a matter of taste when using the method-technique divide in teaching approaches. This regards cases in which no noticeable teaching techniques from the other approach are used with a specific method. These cases can be conceptualized either in a way in which no teaching techniques are incorporated, or in a way in which both the method and techniques are derived from the same main approach (direct or constructivist). In some sense, I view the two expressions as illustrating essentially the same thing: 1) the teacher enacts direct teaching methods with direct teaching techniques, and 2) the teacher enacts direct teaching. The divide between teaching methods and techniques is most meaningful in the most dynamic cases, when methods and techniques are derived from the opposite main approaches in some kind of combination.

Finally, two synthesizing conclusions can be drawn that demonstrate how the theoretical constructs conceptualizing teaching approaches correspond with each other. First, it can be surmised that each of the individual teaching practices observed in Study I that were clustered under the four main categories of constructivist teaching represents either a teaching method or a teaching technique. It also can be inferred that in some cases, the technique can transform into a broader-scale method. Take teacher questions, for example: *Asking a question* is a teaching technique, so it does not make sense to call it a teaching method. However, *teacher questioning* would qualify as a comprehensive teaching method. The questions that the teacher asks would play such a definitive role in the activity that the whole activity can be named accordingly.

Second, a conceptual congruence exists between the theoretical teaching approach constructs utilized in Studies I and III. These conceptual relations are illustrated in Table 2 below. It should be noted that Table 2 is based on conceptual

integration of the systems used in the two studies, not an empirical observation in which they would be dealt with simultaneously.

Table 2. Conceptual relations between teaching approaches' dynamic categorizations in Studies I and III.

Method-Technique configuration (Study I)	Corresponding Teaching Approach (Study III)
Direct teaching methods (with no accompanying constructivist techniques)	One-way direct teaching
Direct teaching methods plus constructivist teaching techniques	Multi-way direct teaching
Constructivist teaching methods plus direct teaching techniques	Multi-way constructivist teaching
Constructivist teaching methods (with no accompanying direct teaching techniques)	One-way constructivist teaching

The system of teaching approaches employed in Study III is already rather ingrained in the sense that it simplifies the teaching approaches to no more than four categories, two of which are the one-way variants, with the remaining two the multi-way variants. The method-technique divide within teaching approaches conceptualized in Study I is at least as, if not more, reductive. When these systems are connected, it can be theorized that the specific method-technique configuration produces a specific kind of teaching approach as a whole (Table 2). The one-way approaches practically mean that the teaching approach does not include considerable teaching techniques from the other approach. However, the multi-way approaches combine the prevailing teaching method with the opposite kind of teaching techniques. Thus, multi-way teaching approaches are ones in which the method-technique divide is most visible in practice, and practical manifestation of teaching dynamics in teaching approaches can be spotted easily.

3.2 Teaching Dynamics in Instructional Reasoning

The first major area in which teaching dynamics function – i.e., teaching approaches – was covered in the previous chapter. That analysis touched on teaching's action level. This chapter focuses on the second major area of research on teachers and teaching: teachers' thought processes embedded in the enactment of teaching approaches, conceived as teachers' instructional reasoning. Based on Studies II and III, I point out two places in which teaching dynamics in instructional reasoning can be located: instructional core dynamics and the related dispositional intention-attention dynamic.

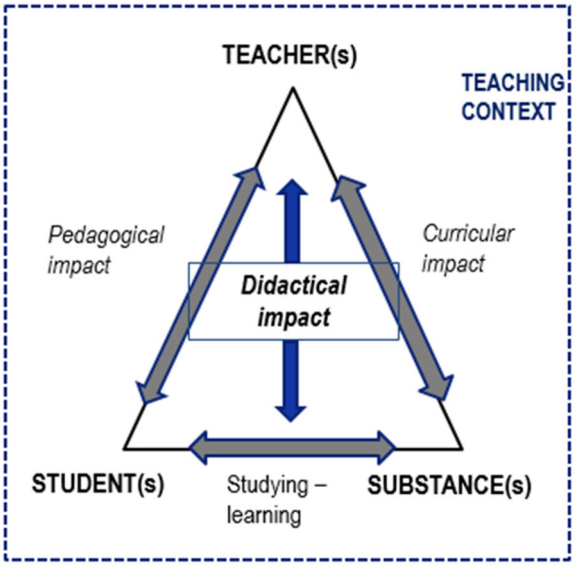

Figure 1. The instructional core framework as implemented in this thesis: instructional elements used to analyze instructional reasons (*Study II*) and causal relations between the core elements used to analyze self-perceived instructional impact (*Study III*).

3.2.1 Instructional Core dynamics

The instructional core's importance is supported here through the following logic: The most definitive function in teacher thinking is instructional reasoning, which focuses on the instructional core (see Figure 1). The idea of an instructional core is presented in various teaching philosophy sources and teacher knowledge studies, although the exact term is used only in some of them. As explained in Chapter 1, the idea of the instructional core is to describe the parties or major elements of teaching activity: teacher(s); student(s); substance; and teaching context(s) (Study II). This simplified teaching model's practical value comes from the fact that it indicates where teaching improvement sources lie (City et al., 2009), i.e., teachers' professional development, both in initial teacher preparation and later in-service programs, should revolve around the instructional core's parties.

The qualities of instructional reasoning were uncovered in two ways. The first way to use the instructional core is to work with its elements, which is important particularly when instructional reasons are examined. Instructional reasons represent the various grounds for the selection of different teaching approaches. The second way to use the instructional core is to employ instructional core relations formed between instructional core elements. The most complete formulation of these relations can be found in the so-called *Didactical Triangle*, which is rooted in the European didactic tradition (Kansanen & Meri, 1999; see also Klette, 2007). The

model introduces the following three instructional core relations: *pedagogical relation* between the students and teacher; *content relation* between the teacher and curricular substance; and *didactical relation*, a double relation in which the teacher relates to the students' relation with curricular content. This model bears a close resemblance to the Anglo-American notion of pedagogical content knowledge. The subject-matter expertise and interaction skills form the basis for teaching competence and teachers' practical knowledge, and are ultimately meant to be integrated into the most unique aspect of teaching work: teacher impacts on students' study activities so that learning improves as much as possible. In this thesis, the relational perspective is utilized in the analysis of causal relations between the instructional core elements in student teachers' reflection. The instructional core framework, as implemented in this work, is presented in Figure 1. Below, I deal with both uses of the instructional core – grounds and causal relations.

In Study II, teachers' instructional reasoning was examined in teachers' practical teaching theories. The teacher knowledge construct of practical theories (e.g., Levin & He, 2008; see also Clark & Peterson, 1986) was used in this study because it represents a highly generalized form of teacher knowledge, thereby offering an instrument with which to investigate the potential complexity of instructional reasons in teacher thinking. Practical theories previously have been used to map out teacher knowledge's general content and origins (Levin & He, 2008), such as teacher beliefs (Stenberg et al., 2014), as well as practical theories' role in orienting teacher action generally in the classroom (Levin et al., 2013). The leading idea in Study II was that practical teaching theories should be connected explicitly to teaching approaches. Teachers' practical theories function so that they orient teachers' decisions between differing teaching approaches.

The basic origin of teaching dynamics in instructional reasoning lies in the various reasons why teachers need to incorporate them into their enactment of teaching approaches. The myriad individual instructional reasons were made sense of by first categorizing them according to the instructional core's four main elements. Study II found that most of the teachers' instructional reasons were related to students and substance. These reasons' frequency was almost the same. Another data-driven category system then was constructed by examining instructional reasons within each main category in more detail. The individual instructional reasons also were coded according to affordance-constraint schema based on whether a specific reason favored or disfavored specific teaching approaches. From an instructional reasoning perspective, we treated practical theories as patterns of multiple instructional reasons: The practical theories expressed instructional reasons in chains. We then discovered how these reasoning patterns could be interpreted as a whole in terms of reasoning complexity in which two criteria were used. Instructional reasoning patterns portrayed higher degrees of complexity when a) they

covered the whole instructional core (context-based reasons were not necessary at this stage of coding), and b) both the affordances and constraints of a teaching approach were considered during the reasoning process. These two interpretation principles illuminate how teaching dynamics emerge in instructional reasoning and how they increase, in this case, in teachers' practical theories.

In Study III, instructional reasoning was analyzed yet again with the help of the instructional core, but now along the lines of causal relations. The causal analysis could be described as phenomenological in the sense that causal relations were sorted out in student teachers' *reflection* of their teaching practice. The aim was to analyze how student teachers perceived the effects that their teaching approaches elicited. This phenomenological analysis of cause and effect in teaching was conceptualized in terms of *self-perceived instructional impact*. Following the definition I used for instructional reasoning (see Chapter 1), *self-perceived instructional impact* refers to teachers' appraisal of the effects that their teaching approaches yield, and that take place through different relations in the instructional core.

Self-perceived instructional impact's relevance was argued in two ways. First, the various teaching approaches' relevance is one of the most enduring topics and interests in teaching research (Fitzgibbons, 1981; Good & Lavigne, 2017; Tobias & Duffy, 2009). As mentioned earlier, the results from this line of research have yielded ambiguous answers and scholarly debates (e.g., Tobias & Duffy, 2009). In fact, the authors of major instructional design reviews (e.g., Hattie, 2008; Good & Lavigne, 2017) have concluded that no definitive solutions can be drawn for teachers to adopt in their diverse and changing classroom contexts, and that ultimately, teachers themselves should learn to analyze their own impact and adapt their teaching approaches accordingly.

Second, research on teacher education has evolved in the same direction on its own behalf. Hiebert et al. (2007) outlined a specific framework for teacher education programs in which, instead of being trained on predefined best practices, student teachers are instructed on how to analyze real-life teaching incidents systematically from the perspective of cause and effect during the various teaching stages. This deliberate analysis of the teaching framework originally was conceptual, but since has been used to implement and investigate student teachers' analysis of their impact on the various parts of the instructional process (Yeh & Santagata, 2015). However, Hiebert et al.'s (2007) model and later applications (e.g., Yeh & Santagata, 2015) do not address deliberate causal analysis of teaching explicitly in the context of the instructional core, i.e., they are not united. Conversely, applications of the instructional core (Stenberg et al., 2014) have not been connected often to causal analysis in teachers' reflections. In fact, City et al. (2009) published one of the rare studies that linked the two in their school improvement program, in what they named a "network approach." I find this network approach dynamic in the sense that it

covers the multitude of influences present in teaching and demonstrates how they influence each other. The instructional network, according to them, is to be found in the instructional core. However, City et al. (2009) and other Anglo-American sources on the instructional core do not conceptualize the various relations in the instructional core explicitly; they only name the elements and refer to the relations between them. The European didactic tradition offers the most complete iteration of the instructional core (Didactic Triangle), in which relations are distinguished and named accurately (Kansanen & Meri, 1999; Stenberg et al., 2014; Toom et al., 2019).

The types of instructional impact in teaching were used in the following way in Study III. *Pedagogical impact* refers to the personal influence between the teacher and students, and is the most human and interactive by nature. *Curricular impact* concerns the transformation of teaching substance by the teacher, i.e., the teacher influences teaching content itself, which then manifests in teaching interaction. *Didactical impact* blends the two together: The teacher is expected to elicit positive changes in students' study activities aimed at learning. This requires both interactive functioning, as well as content expertise from the teacher, and resembles Shulman's (1987) pedagogical content knowledge.

The dynamics taking place in student teachers' self-perceived instructional impact were investigated in a two-fold way (see Chapter 2). First, the student teachers were instructed to select two opposite kinds of critical incidents from their practicum lesson: one empowering and the other challenging. This enabled us to investigate both effective and ineffective impacts from student teachers' reflection. Second, self-perceived instructional impacts were placed on the instructional core relations. Study III's results revealed the following dynamics in self-perceived instructional impacts:

1) The student teachers perceived pedagogical and didactical impacts most frequently, and the distribution between these two types of impacts was even
2) The non-interactive curricular impact was much less reflected
3) Although both the pedagogical and didactical impacts were emphasized in student teachers' reflection, the efficacy between the two demonstrated exactly the opposite trend:
    a) Over two-thirds of didactical impacts were perceived as effective (and the remaining third ineffective)
    b) Over two-thirds of pedagogical impacts were perceived as ineffective (and the remaining third effective)

It can be concluded from these results that when reflection takes place in the actual teaching event's context, student teachers' perceptions focus intensively on the various interactive and highly action-specific aspects of teaching. Student teachers'

perceptions of their own teaching outcomes accumulated evenly through personal and study-related influences. The overall dynamic was this: Successes were perceived in the didactical organization of teaching, but challenges were perceived in pedagogical encounters with students. It is interesting that the didactical perceptions were largely so positive, with the student teachers experiencing their influence on students' study activities as mostly effective and successful. The challenges cited mostly entailed personal interaction with students. This is rather striking and is triangulated later (LTT patterns). It also should be noted that in the context of live classroom teaching, teaching substance received only a very limited amount of attention in student teachers' reflection. Thus, the transformation, selection, and critical review of curricular content – and the student teachers' own relation to the content – were reflected on very rarely. However, reflections focusing on teaching content were not absent. In particular, one student teacher's perception of her teaching influence focused on the curricular relation, in which she analyzed and appraised her selection of a historical perspective and her explanation of it to students during a history lesson.

Although the data sets and results are not comparable, it is also interesting that in the in-service teachers' practical theories, curricular substance's role can be interpreted as showing up more often (Study II). This confirms the importance of using a variety of data types and analytical methods in the analysis of teachers' instructional reasoning: The more one aims at inspecting content knowledge's role in teachers' reflection, the more general type of reflective data one needs, and vice versa (cf. Clark & Peterson, 1986). When reflective data comprise critical teaching incidents – particularly those triggered with video recordings – the interactive dynamics seem to assume more prominence. However, one result can be interpreted as similar between the two studies. Student-related reasons' role in practical theories (Study II) and self-perceived pedagogical impacts in student teachers' STR reflection (Study III) were highlighted. Teachers focused on their students and their own relationships with them in both generalized and action-specific forms of instructional reasoning.

The following subsection concerns reducing instructional core dynamics into two major dispositional attitudes that emerge out of teachers' instructional reasoning.

3.2.2 Dispositional Intention-Attention dynamic

Based on reading recent teacher education literature, two important teacher knowledge constructs play a crucial role at the moment: *instructional core practices* (e.g., Grossman, 2018; Windschitl & Barton, 2016) and *teacher dispositions* (e.g., Altan et al., 2017; Damon, 2007; Dottin, 2009). A third construct can be added: *teacher intentions* (Kennedy, 2006). Focused research on teacher intentions is

surprisingly scarce. The reason why I added teacher intentions here is the construct's significance as underlined in research works by Kennedy (2006; 2016). Also, the three seem to denote something similar or connected. I think that what the three concepts try to signify is some kind of holistic mode of teacher knowledge, but they also are used usually in a very action-oriented (cf. Mena & Clarke, 2015) sense, and their relevance from the perspective of teacher learning is noted. Thus, they are some kind of comprehensive forms of teachers' practical knowledge that play an intimate role within and behind teacher action. In this subsection and in Subsection 3.3.2 ("Learning-to-Teach dynamics"), I try to elaborate the relations between these three major constructs and explain how they are used in this work (Studies II and III) from the perspective of instructional reasoning dynamics. Ultimately, the aim is to demonstrate not only how each construct plays a unique role in instructional reasoning research, but also how they have important applicability in teacher education programs.

In Study II, a construct to describe the comprehensive mode of instructional reasoning was needed. The study added to existing research on practical theories that, from the perspective of instructional reasoning, practical theories can be understood as patterns of instructional reasoning. In this way, practical theories can be used to make sense of the dynamics in instructional reasoning: They bring together the multiplicity of reasons that teachers need to incorporate into their thinking and action. Thus, instructional reasoning can be analyzed by categorizing individual instructional reasons that relate to differing elements in the instructional core, but also can be analyzed as dynamic chains in which instructional reasons show up together. But how can these reasoning chains be categorized? For this, we employed the concept of teacher disposition. Although teacher dispositions are a remarkable development in teacher education literature, the concept remains somewhat ambiguous. The construct of dispositions is used to remark on moral value orientations in teaching (Sockett, 2006). Nelsen (2015) clarified the concept, noting that it refers to clusters of habits. The "clusters" refer to comprehensiveness, and in Study II, they were elaborated further, aiming at formulation of key mindsets essential for teaching. Dottin's (2009) work was followed here, as she connects dispositions to teachers' professional judgment.

The concept of dispositions also has been used in fields other than teacher education, e.g., in research on critical thinking (Hyytinen, 2015). Dispositions are important because they complement human action structure by adding a missing third element to knowledge and skills (Hyytinen, 2015, p. 7). One may know how to do something (knowledge) and be able to do something (skills), but these do not indicate whether or not one is *actually doing it* (e.g., thinking critically). Dispositions refer to this third aspect and are important because it often matters most, from a practice perspective, whether or not one is actually doing something. But how does

this apply to the context of teaching and teacher education? I think that the matter can be connected to the challenging relations between teacher thinking and action (Clark & Peterson, 1986; Gitomer & Zisk, 2015; König & Pflanzl, 2016). Ultimately, teacher dispositions can be defined as teachers' actualized and consistent (long-term) tendencies to engage in specific instructional actions in teaching. In this sense, dispositions refer to teacher action level. However, it seems as if dispositions also include a teacher thinking component. In Study II, it was suggested that from a teacher thinking perspective, teacher dispositions could be defined *as teachers' actual and pervasive tendencies in instructional reasoning*. Because practical theories compile several instructional reasons, teacher dispositions could be sought out with the help of practical theories.

In Study II, the instructional reasons were linked to the instructional core framework. The other aim, following this logic, was also to connect the more comprehensive teacher dispositions to the instructional core. Thus, teacher dispositions were defined further as *teachers' actual reasoning patterns that focus on instructional core elements.* Considering that the dispositions are comprehensive mindsets, they were used to reduce instructional core dynamics to the simplest basic modes of instructional reasoning. We reconstructed two major types of teacher dispositions: *instructional intention* and *instructional attention*. These essential teacher dispositions were linked to the instructional core:

a) Instructional intention refers to actual teacher reasoning tendency in which most instructional reasons are attached to substance-related grounds in the instructional core

b) Instructional attention refers to actual teacher reasoning tendency in which most instructional reasons are attached to person- and situation-related (teacher, student, and context) grounds in the instructional core.

In this way, teacher dispositions' practical value can be illuminated further because the instructional core presents the essential arena of teacher thinking and action. The results also help in arguing for teaching substance's significance in teaching. Teaching substance is so critical because teacher intentions – the purposes of teaching – are derived from it. And this intentional functioning covers not only some limited areas of subject-specific teaching content, but rather the whole complexity of curricular substance, including value-related instructional aims. Most of the reconstructed practical theories (almost 70%) embodied instructional attention as the major teacher disposition. This was to be expected because the sheer *a priori* number of person- and situation-related factors in the instructional core outnumbered the number of intentional reasons by 3-to-1. However, it can be speculated that this somehow reflects actual cases in teaching, i.e., the situation at hand often defines what can be pursued intentionally in the classroom (Husu, 2002). However, I do not find the number here

to be that important. The important conclusion is the two-fold way that teacher dispositions can be made sense of and connected to the instructional core.

Interestingly, Rosiek (2003) seems to highlight a very similar idea by conceptualizing *emotional scaffolding* as a critical feature in pedagogical content knowledge. Emotional scaffolding refers to teachers' ways of dealing with curricular substance by carefully adapting it to students' emotional needs (Rosiek, 2003). Whereas my split between intentional and attentional dispositions describes the two different dispositional attitudes needed in teaching, Rosiek's conception of emotional scaffolding demonstrates how the two functions unite in teacher knowledge and practice. Study II confirms the practical value of dispositions noted in the teacher education community in recent years. In fact, I view the dispositional intention-attention dynamic as coming very close to defining the most important qualities of teaching and teacher education. A good teacher's core qualities can be addressed in terms of the two presented teacher dispositions. The teacher possesses a dynamic tendency to engage in practical reasoning in terms of curricular substance, from which teaching purposes are drawn, and on the basis of varying situational demands in teaching. The core dynamics in instructional reasoning then lie in balancing these different and potentially conflicting dispositional attitudes in one's teaching practice.

3.3 Integrating Teaching Dynamics

This section asserts that two specific places exist in which teaching dynamics in teaching approaches and instructional reasoning come in close contact with each other, and even unite. These two places are teaching choices and patterns in learning to teach. In these areas, the dynamics are integrated into teaching practice – and in teachers' practical experience.

3.3.1 The Four Teaching Dimensions: The Dynamics of Choice

Choice (or decision) can be viewed as the nexus of thinking and acting. Indeed, it is difficult to define whether choosing or choices refer to thinking or action (cf. Pettit, 2010). In any case, the point is that the part of thinking that comes closest to acting is choosing: If one moves even one step closer to action from choosing, one is already acting (cf. Borko et al., 2008). In philosophical action theory, it also is noted that reasoning functions exclusively in the context of choosing (Korsgaard, 2015), i.e., reasons are needed only when choices must be made, and conversely, if no choices are available, no need exists for reasons. In Study II, it was argued that instructional reasoning in teachers' practical theories can be analyzed thoroughly only when connected to teaching choices. In my work, I have defined the most unique area of

teacher action, requiring choices to be the enactment of differing teaching approaches. Thus, in teaching practice, choices regarding teaching approaches trigger teachers' instructional reasoning (Study II).

Insights at the end of Study I and analytical needs at the beginning of Study II lead to an important theoretical advance. The four constructivist teaching categories (exercise of student autonomy, use of knowledge-structuring activities, organization of authentic learning environments, and organization of problem-oriented learning environments) were extended to four teaching dimensions in the following way (Table 3):

Table 3. Extension of the constructivist teaching categories to more general dimensions of choice in teaching approaches.

Constructivist teaching category (Study I)	**Extension of categories to dimensions of choice in teaching approaches (Study II)**
exercise of student autonomy	*division of instructional responsibility*
use of knowledge-structuring activities	*degree of instructional openness*
organization of authentic learning environments	*degree of instructional authenticity*
organization of problem-oriented learning environments	*direction of instructional cycle*

Whereas the method-technique divide enabled capture of the two dynamic *aspects* within teaching approaches (Study I), and the one-way/multi-way split made sense of the dynamic *combinations* of teaching approaches (Study III), the aforementioned extension helped crystallize teaching dynamics with the help of four separate *dimensions* of choice embedded in teaching approaches. The main idea here is that the teaching approaches operate along separate dimensions, and that a teaching approach in a given case is the sum total of choices made on the four dimensions, which are continuums. Each dimension has both a direct teaching end and a constructivist teaching end. The dynamic four-dimensional view of teaching approaches is provided below (Table 4):

Table 4. A dimensional model of teaching approaches: the four teaching dimensions.

DIRECT TEACHING	← teacher	***division of instructional responsibility***	student →	**CONSTRUCTIVIST TEACHING**
	← lower	***degree of instructional openness***	higher →	
	← lower	***degree of instructional authenticity***	higher →	
	← deductive	***direction of instructional cycle***	inductive →	

In teachers' practical teaching theories, it was apparent that the teachers did not always deal with teaching approaches as comprehensive wholes. Although teaching-approach categorizations – particularly the dynamic ones used in this work – could be used to interpret teachers' classroom action, this was difficult to do when interpreting teachers' own practical thinking in their practical theories. It seemed that teachers tended to focus on one dimension at a time. Although the dimensions overlap in practice, and did so in interview data, the teachers often seemed to weigh specific choices one at a time. The choices could be located within some of these four dimensions (Table 4), with each of the choices explained below:

1) *division of instructional responsibility*: Refers to sharing control of study activities between teachers and students within a teaching approach (e.g., more teacher-regulated vs. more student (co)-regulated practices)
2) *degree of instructional openness*: Refers to defining how predefined the study processes and learning products are supposed to be within a teaching approach (e.g., clearer correct answers vs. spontaneous student input during classroom discussion)
3) *degree of instructional authenticity*: Refers to choices between environments and materials that are more "real-life," and those made specifically for instructional purposes (e.g., classroom environment and textbooks vs. outdoor environments and context-specific equipment)
4) *direction of instructional cycle*: Refers to the "route" along which study activities are conducted, either more deductively from models to applications or more inductively from applications to models (e.g., explicit instruction vs. inquiry teaching)

For example, the teacher's focus could lie in deciding to what extent unanticipated student input was incorporated into teaching during instructional discussions. This would be a choice regarding the degree of instructional openness. Although it often could be inferred as to what kind of comprehensive activity and teaching approach a teacher referred to, the teachers frequently seemed to emphasize or focus on one of these choices. One teacher in her complex practical theory reflected on her decisions between authentic and more structured teaching environments. The focus was clearly on the degree of instructional authenticity, at both the instructional materials level (e.g., real-life equipment, e.g., binoculars vs. textbooks) and teaching-environment level (e.g., outdoor space vs. classroom environment). Most of the choices in practical theories related to division of instructional responsibility between the teacher and students. These choices focused on defining the responsible agent in leading study activities. This leading responsibility might lean more toward the teacher's side or the students' side. Student-regulated activities covered both

individual and collaborative forms of student autonomy. From the perspective of integrated teaching dynamics, it is interesting that the choice within teaching approaches that teachers considered most in their thinking (Study II) also divided teachers' observable teaching approaches into two main groups (Study I). Variations in the exercise of student autonomy formed the two differing approaches of constructivist teaching, and the corresponding choice, the division of instructional responsibility, was reflected most in the practical teaching theories (see also Table 3). This suggests that this dimension in teaching approaches might deserve significant attention and reflection in teacher learning and initial teacher education.

3.3.2 Learning-to-Teach dynamics

The second – and in some sense ultimate – area in which teaching dynamics are integrated is teachers' *learning-to-teach* (LTT) dynamics. The LTT construct was the topic of Study III, where it was presented conceptually and examined empirically in the context of student teachers' practicum experiences. However, in following my work's overall logic, I wish to stress that the LTT construct is supposed to be universal in the sense that it aims to make sense of teachers' learning experience at various stages of their teaching careers. Thus, the construct is meant to make sense of teacher learning experience in a rather context-independent way.

Like Study II, Study III's aim was largely a synthesizing one: Three teacher knowledge constructs were elaborated conceptually and united into a specific LTT framework, comprising three individual LTT domains: teaching approaches; teacher intentions; and self-perceived instructional impact. As in all part-studies, teaching approaches were the starting point in the analysis of teaching practice, and in Study III, it was observed at student teachers' action level. Pitkäniemi's (2009) dynamic teaching approach model was modified and applied to analyze teaching approaches (one-way and multi-way variants of direct teaching and constructivist teaching; see also Section 3.1). Teacher intentions and self-perceived instructional impact were used as teacher thinking-level constructs. Considering that I already discussed teaching approaches and self-perceived instructional impact in previous sections, I focus next on teacher intentions, as they were treated slightly differently in Study III than in Study II's dispositional characterization.

As noted briefly in Section 3.2.2, teacher intentions can be viewed as one of the more comprehensive types of teacher knowledge constructs. I also listed instructional core practices and teacher dispositions – two recent ideas in teacher education literature – as belonging to this same group. Moreover, instructional intention was conceptualized as one of the two essential teacher dispositions in Study II. So, how do these concepts relate to each other? The question is important from

the perspective of practice if these ideas are to be applied coherently in research and teacher education programs.

As a teacher disposition, *instructional intention* is a pervasive reasoning tendency realized in long-run teaching practice. As such, it represents a comprehensive "mindset" that comes close to teachers' character and practical wisdom (cf. Carr, 2003). *Teacher intentions*, although rather comprehensive, nevertheless entail more action-specific goals embedded in teachers' classroom action. Another difference can be seen in perspective. When contrasted with instructional attention, the other teacher disposition, instructional intention signifies teaching's goal-oriented (intentional) *side*. However, teacher intentions entail the intentional *nature* of teaching (see also Byman & Kansanen, 2008). Even when very action-specific, teacher actions are purposive. In this categorization, situational (attentive) actions also are intentional fundamentally, carrying an instructional purpose. In fact, some teacher intentions formulated by Kennedy (2006) could be characterized as highly attentive. I suggest that a certain conceptual relation also exists between instructional core practices (Grossman, 2018) and teacher intentions. Quite interestingly, Kennedy (2016) herself differentiates between the two, suggesting that her approach represents "an alternative way to parse teaching practice." Kennedy's key argument is that the recent idea of core practices has replaced one problem with another. There has been a shift in emphasis from education-theory-type coursework to practice-based programs in teacher education. Kennedy noted that highlighting a specific set of observable core practices has left purposes by the wayside, failing to get the attention they deserve. "Too theoretical" has been replaced with "too behavioral." Kennedy states that the most crucial issue in teacher learning is processing the *links* between teacher actions *and* purposes that teachers try to pursue through them.

I fully agree with Kennedy's analysis, but suggest that core practices can be reformulated conceptually so that the term signifies what Kennedy wishes to convey. My thesis contends that instructional core practices cover both the activity and teacher's intention behind it; thus, core practices are a kind of composite term. One reason why I suggest this is that, when so formulated, Kennedy's analysis offers a perfect list of core teaching practices. Instead of using various, often-subject-specific sets of very detailed – and maybe solely behavioral – actions, the Kennedy framework lays down a few basic core practices. However, the framework also can be used to describe teacher intentions in Kennedy's original way (2006). In philosophical action theory, it is known that often, the intention and the intentional action cannot be separated meaningfully (Anscombe, 1985), i.e., how one acts often reveals what one intends. I suggest formulating the relation between core practices and teacher intentions in this way: *Instructional core practices include both the teaching activity and the embedded intention, whereas teacher intentions signify core practice minus*

the activity. In teacher education, various needs exist in different contexts in which different kinds of descriptive systems are needed. In some cases, we need concepts that describe the totality of action and thinking, whereas in other cases, only the thinking level is needed. In Study III, the relations between different learning-to-teach domains were examined. In this case, teacher intentions were used because they enabled us to link teacher thinking to other teacher-action-related LTT domains: teaching approaches and self-perceived instructional impact. If core practices had been used, this would have caused confusion because the action part would have overlapped with the two separate action-level LTT domains employed in the study.

The latest Kennedy framework (2016) differs slightly from the previous iteration (2006), as she uses the concept of teacher intentions more explicitly in the older work. The set of teacher intentions comprises the following (2016): *portraying the curriculum; enlisting student participation; exposing student thinking; containing student behavior;* and *accommodating personal needs*. Based on the data analysis in Study III, the category exposing student thinking was combined with the category portraying the curriculum, and exposing student thinking did not manifest as a critical teacher intention on its own in student teachers' reflection. I think that the framework itself can be characterized as being dynamic in two particular ways. First, the relations between a specific intention and the possible corresponding action that the teacher takes are not straightforward, but rather complex. Second, the intentions potentially conflict with each other, so that a critical part of teacher learning is to provide appropriate relative weight to each intention, i.e., to learn to balance them properly in practice. In Study III, the learning-to-teach dynamics were examined further through the LTT framework, in which teaching approaches, teacher intentions, and self-perceived instructional impact were analyzed in tandem.

Study III suggested that four qualitatively different LTT patterns emerged out of student teachers' reflection on their critical teaching incidents. The patterns could be reduced to two didactical and two pedagogical patterns based particularly on the perceived impact's nature. The LTT patterns are summarized below:

- ***Didactical pattern 1*****:** *Effective portrayal of curriculum through direct teaching*
- ***Pedagogical pattern 1*****:** *Ineffective containment of student behavior during one-way teaching*
- ***Didactical pattern 2*****:** *Mixed effects in enlisting student participation through multi-way direct teaching*
- ***Pedagogical pattern 2*****:** *Mixed effects in accommodating personal needs through multi-way direct teaching*

These patterns confirm findings by Männikkö and Husu (2018) who, starting from the instructional core, ultimately reduced teachers' teaching strategies to two main

categories: interactive and instructional strategies. The didactical LTT patterns resemble instructional features, and the pedagogical patterns resemble interactive qualities. As noted earlier, curricular notions were not emphasized to the extent that they would have appeared as a distinguished pattern.

The first didactical pattern illustrates that portraying curriculum was a frequent teacher intention in student teachers' practice, and that it usually was linked to direct teaching episodes. Both direct teaching approaches were represented in this pattern, and the impacts that student teachers perceived were mostly effective. The pattern indicates that student teachers faced empowering experiences in cases in which they acted as responsible agents in dealing with the curricular substance with students.

The first pedagogical pattern indicates that containing student behavior was also a frequent teacher intention entertained by the student teachers and that it was usually connected to one-way teaching approaches. However, the perceived efficacy with this intention-approach combination was low. The patterns included both one-way direct teaching and one-way constructivist teaching. The interesting dynamic here is that they represent both extremes of the teaching approach continuum: The pattern appeared in the context of the most direct (teacher presentations) and most constructivist (e.g., collaborative learning) approaches.

The second didactical pattern concerns enlisting student participation as a teacher intention, which often was linked to multi-way direct teaching, with varying perceived effects. The pattern also covered different kinds of classroom dialogue episodes and highlighted student teachers' attempt to motivate their students through and within the dialogical setting – the dynamic being that this attempt often failed, but also often succeeded.

The second pedagogical pattern indicated a dynamic similar to the previous one. The other intention that student teachers reflected in the context of multi-way direct teaching was accommodating personal needs. Again, the impacts were perceived as mixed. Sometimes the intention was realized successfully in practice, and sometimes it was not. The pattern clearly highlights moral outcomes and ethical reflection, so that the dynamic qualities were divided into two: prioritizing care (effective cases) and compromising care (ineffective cases). The pattern confirms how "the moral work of teaching" (cf. Sanger & Osguthorpe, 2013) appears as one critical learning-to-teach facet.

4 Discussion: Implications of Teaching Dynamics

In this final chapter of the thesis, I discuss what kinds of conclusions and practical implications can be drawn from the research. I also discuss teaching dynamics' implications with regard to two areas: teaching and teacher education. Thereafter, the methodological questions of the thesis and possible directions for future research on teaching dynamics are discussed.

4.1 Theoretical implications

The purpose of this thesis was to elaborate a theoretical framework for the essential dynamic qualities embedded in teaching work. I aimed to make a synthetic contribution by creating a sort of meta-framework that enables multiple ways of theorizing teaching and teacher education, and particularly helps locate the differing elements of teachers' practical knowledge and reflective practice on a complete landscape. Lack of systematics, accumulation, and coherence tend to characterize research on teachers, teaching, and teacher education, i.e., several constructs are used to understand practice and teacher knowledge (cf. Gitomer & Zisk, 2015; see also Toom, 2017). The theoretical framework presented in Chapter 3 attempted to synthesize the underlying mechanisms that elicit the complex interactions, judgment calls, and dilemma-centric situations that teachers face in their practice and that researchers often have studied in the field of teaching and teacher education (cf. Berlak & Berlak, 1981). The adopted perspective sought to systematize teaching competency in terms of potential, thoughtful dynamic shifts between various alternatives within the key domains of teaching practice and teacher knowledge, as opposed to conforming to any single set of practices as such. In fulfilling this study's research aim, three main assertions were put forth. First, it was asserted that teaching dynamics operate at the core of teachers' classroom practice and in the enactment of teaching approaches. Second, it was asserted that teaching dynamics function within instructional reasoning, with teachers' practical thinking embedded in the enactment of teaching approaches. Third, it was asserted that teaching dynamics were integrated in teaching experience, at the nexus of teaching approaches and instructional

reasoning. These three main domains of teaching dynamics were described as comprising two sub-dynamics resulting in six dynamic teaching qualities.

The leading idea was that the most comprehensive feature in teaching practice is its dynamic nature. Theoretically, this idea follows the classic notions of decision-making, uncertainty, and dilemma management so manifestly present in teaching work (Kansanen et al., 2000; Lampert, 1984; Shavelson, 1973). The teaching-dynamics concept echoes teaching as "enormously difficult" (Labaree, 2000) and elaborates it in terms of teaching's core mechanisms. The theoretical contribution of the system of teaching dynamics is that it helps synthesize research on teaching and teacher education by theoretically crystallizing the essential areas of teaching approaches and instructional reasoning. It also describes these areas by representing the underlying mechanisms that then might elicit challenges and complexities in teachers' experience. The dynamic conception of teaching explains that teaching approaches and instructional reasoning often comprise dialectic counterparts that both merit teacher's consideration. For example, the direct-constructivist dynamic within teaching approaches reformulate the age-old dispute regarding "the one best way of teaching" (Burbules, 2000) by first conceptualizing alternative teaching approaches as accurately as possible, then stating that critical to the enactment of teaching approaches is movement between the modes of direct presentation and students' constructive activities, both of which carry educational potential (see also Pitkäniemi, 2009).

To make sense of the teaching-approach combinations, three mechanisms were examined. Pitkäniemi's (2009) categorization of one-way and multi-way application was modified and applied so that intermediate applications of both main approaches (direct and constructivist) were formed. We also elaborated a specific method-technique dynamic (cf. Kansanen, 2004) to explain further why exactly teaching approaches can be interpreted as often exhibiting both constructivist and direct elements simultaneously. It was suggested that teaching approaches comprise two aspects: the method aspect (*macro-practices*) and technique aspect (*micro-practices*). While either direct or constructivist teaching plays the method role in each given case, practices from the opposite approach can be implemented as smaller-scale complementary teaching techniques. The method-technique dynamic implies that more nuanced distinctions should be made when analyzing teaching approaches.

This thesis presented a multi-dimensional model of teaching approaches that comprises four separate teaching dimensions, each of which has the *direct teaching end* and *constructivist teaching end*. The theoretical implication is that teaching approaches can be viewed from the point of dimensions instead of exclusive categories. No one single teaching mechanism exists that splits teaching approaches, but both construction and directness can manifest in different ways, along separate

dimensions. The multi-dimensional view of teaching approaches demonstrates how the teacher can enact direct teaching practices on some of the teaching dimensions (e.g., the division of instructional responsibility), while simultaneously operating in terms of constructivist principles on some other dimensions (e.g., degree of instructional openness). Of all four teaching dimensions, the division of instructional responsibility seemed to make the most difference in teaching approaches. The observed teaching could be characterized as being the most comprehensively constructivist when student autonomy was emphasized. However, there also seemed to be more moderate implementations of constructivist teaching in which teacher responsibility was prevalent. Interestingly, in line with this, choices that triggered teachers' instructional reasoning most often concerned the division of instructional responsibility.

Three theoretical implications are outlined in terms of teaching dynamics in instructional reasoning. First, I put forth a more delineated definition of *instructional reasoning*, as teachers' practical thinking that a) chooses between the different teaching approaches, and b) focuses on the instructional core, i.e., uses instructional core elements (teacher, student, substance, and context) as the basis on which the choices within teaching approaches are made. This theorization attaches teachers' practical reasoning more exclusively to the unique key features of teaching work.

Second, the instructional core framework was developed, in which two uses of the framework were suggested. The instructional core elements function as individual instructional rationale in teacher thinking, whereas the most meaningful use of instructional core relations is to be found in causal reflection. The first use can be extended to pattern analysis, in which instructional reasons are examined in chains. By examining chains of reasoning, increased dynamics can be found: The most dynamic reasoning patterns broadly cover the various elements of the instructional core. The second use was conceptualized as self-perceived instructional impact that functions as a key mechanism in teachers' practice-based learning. Empirically, an interesting dynamic emerged in our student teaching data: Student teachers perceived mostly effective didactical impacts in their classroom practice, whereas pedagogical impacts were perceived as more ineffective. Pedagogical encounters' challenging nature, e.g., in the form of teacher-student relationships and classroom management, has been highlighted before (Heikonen et al., 2017; van Manen, 2015), and this work's results correspond with this.

The third theoretical implication concerning instructional reasoning was that the notion of teacher dispositions can be defined so that it has a special link to instructional reasoning. Although a connection between teachers' professional judgment and dispositions has been suggested before (e.g., Dottin, 2009), the specific relations between instructional reasoning and teacher dispositions have not been clearly articulated. Instead, teacher dispositions have been conceptualized more

often as teacher action patterns or mind frames, frequently referring to philosophical (e.g., Deweyan) sources (Altan et al., 2017). In this thesis, I suggested that from the perspective of instructional reasoning, teacher dispositions can be defined as teachers' pervasive reasoning tendencies that focus on the instructional core. This helps operationalize the dispositional mind frames in practice and link dispositions to the pivotal instructional core framework.

4.2 Practical implications

This study's implications for teaching education and practice can be summarized this way: Teaching work should be understood increasingly as dynamic practice, and the focus of teacher education should be on dealing with the dynamic processes of teaching in various ways.

The results call for a nuanced understanding of teaching approaches at the level of curriculum reforms. In recent decades, a growing trend has entailed efforts to change teaching approaches in schools to more constructivist-type practices (e.g., Gage, 2009; Salonen-Hakomäki et al., 2016; Terhart, 2003). These reforms also have triggered critical discussion, usually culminating in ambiguous efficacy in constructivist teaching approaches (Gage, 2009; Kirschner et al., 2006; Tobias & Duffy, 2009). The implication from my work is that treating teaching approaches at the general level of school-policy changes and curriculum reforms is challenging due to the complex nature of teaching approaches and conceptual ambiguities that easily follow. The dynamic system illustrates what kind of complexities prevail in teaching approaches, helping to clarify the discussion conceptually. For example, the dimensional view of teaching approaches demonstrates that suggested curriculum changes can take place in some teaching dimensions more easily than in others.

A timely example from Finland is the newest curriculum reform predicated on so-called phenomenon-based learning (Finnish National Core Curriculum, 2014). According to the dimensional model of teaching approaches, the principles of phenomenon-based teaching are located in the dimension of the degree of instructional authenticity. However, in public discussions concerning curriculum reform, teaching approaches are easily dealt with in terms of "package deals" in which the teaching dimensions are not separated. Interestingly, the results from this work suggested that within the scope of constructivist teaching practices, authentic teaching activities were those that also could manifest during direct teaching approaches. This actually suggests that phenomenon-based teaching can elicit a rather promising implementation of curriculum reform because it may have a relatively broad applicability in diverse teaching contexts. Furthermore, choices in teaching should be wise, and it is unclear how such choices ultimately could be made anywhere else than "inside teaching," in which differing, often situational needs

unfold to teachers (Kennedy, 2006; see also Loughran, 2019). Although societal and community-level regulation takes place in forming the curricular substance taught in schools, I suggest that the enactment of teaching approaches is the key area in which teachers' pedagogical freedom and autonomy should operate. This is why, I would argue, instructional reasoning is – and should be – cultivated in teacher education and learning in schools.

The practical implication of teaching dynamics for teacher education is that it enables systematization of teacher reflection. Teacher education should guide student teachers explicitly on how to handle different teaching approaches wisely, which can be done through prolonged, reflective enactment of teaching approaches accompanied by a continuously developed instructional reasoning capacity. The teaching-dynamics framework contributes to this reflective process by systematizing the features of teaching approaches and instructional reasoning so that practical tools in training these two capacities can be developed. The key feature of supported teacher reflection and learning is that the dynamic counterparts present in teaching practice should be reviewed and reflected upon profoundly among student teachers. This perspective represents an alternative to univocal teacher change agendas that aim to steer teachers' beliefs and practices in one direction, e.g., toward constructivist principles (Fives et al., 2015). The dynamic teaching-approach categories help make teaching choices more visible. Dynamic instructional reasoning categories enable teacher educators to guide student teachers in their practical thinking by demonstrating various and often-conflicting demands in their classroom settings that should all be incorporated and balanced in their decision-making.

The starting point of teacher reflection lies in the enactment of teaching approaches, and reflection can be assisted by using the teaching-approach categories in varying stages of the instructional process (Clark & Peterson, 1986; Kansanen et al., 2000), particularly in practicum supervision (Husu et al., 2008). During teacher planning, the teaching-approach categories can be used to help student teachers consider the basic alternatives to organizing classroom activities. Reflection then can be guided toward a more detailed analysis of instructional mechanisms within the reflected-upon teaching approaches. The essential principle concerning teaching approaches is that the reflective process gradually should lead to increasingly dynamic conceptions about teaching approaches, so that student teachers can actualize the possibilities of very different kinds of teaching approaches in enlightened ways. For example, this can mean that during the early practicums, various teaching approaches are tested and trained one at a time with the help of supervisors, and that during the final practicums, the emphasis shifts toward student teachers' more autonomous choices in selecting teaching approaches. Practicing to

combine different teaching approaches prepares student teachers for the flexible use of teaching approaches in their own diverse classroom settings in the future.

The teaching approaches also can be reflected on in a more action-oriented way during teaching practicums. This shifts the emphasis from pre-interactive reflection to analysis of already-conducted teaching episodes, e.g., with the help of video-recordings. This enables student teachers to theorize classroom activities' qualities afterward, thereby clarifying possible tacit and intuitive aspects of teaching-approach enactment. This helps student teachers make sense of practical intentions embedded in their practice (Kennedy, 2006) and engage in practical theorizing based on their teaching experience, i.e., explaining what generally applicable knowledge can be inferred from particular teaching incidents (Toom et al., 2015). In student teachers' upcoming in-service teaching, these repeated reflection cycles are used to construct practical teaching theories, i.e., generalized practice-based mindsets that help students face new unfolding teaching situations. The presented learning-to-teach framework offers a tool with which to connect student teachers' action and thinking systematically, particularly in the context of teaching practicums, with emerging qualitative patterns hinting at what kind of empowering and challenging experiences might be faced during the first teaching stages.

4.3 Methodological reflections

Three complementary methods were used in this thesis to uncover the teaching-dynamics qualities that function in teaching approaches and teachers' instructional reasoning. Video-recorded observations were utilized to analyze teachers' enactment of teaching approaches at the teacher action level in their classroom practices. Thematic interviews also were conducted to reveal crucial dynamic features of teachers' instructional reasoning. Finally, stimulated-recall interviews were used to analyze teaching approaches and instructional reasoning in tandem, now in the context of student-teachers' practicum experiences. Together, these three empirical approaches helped reveal dynamic features of teaching approaches and instructional reasoning in the different states of teacher knowledge and action – in teachers' observable classroom actions, generalized practical theories, and interactive decision-making – in which teacher thinking and acting are inseparable (Clark & Peterson, 1986; Gitomer & Zisk, 2015; Loughran, 2019). It can be said that teacher planning was the major area that was not focused on explicitly (see, e.g., Clark & Peterson, 1986).

The analytical procedures followed the principles of abductive content analysis (Timmermans & Tavory, 2012), though leaning toward the theory-driven end of the continuum. This corresponded with the study's conceptual orientation, in which I aimed first and foremost at constructing a theoretical framework that synthesizes the

essential dynamic aspects of teaching approaches and instructional reasoning. However, the weakness of this theory-driven analytical approach is that it does not place individual teachers' voices at the forefront in similar intensity to what is done in many qualitative approaches (Denzin & Lincoln, 2011).

However, the analytical procedures in the various part-studies had limitations, the most important of which is that the theory-driven constructivist-teaching categories used in Study I were allowed to overlap with each other, so that the durations in the time analysis could multiply due to co-occurrence of several coding categories. When the categories were simplified and extended to more general teaching dimensions in Study II, this overlap could be avoided. This kind of simplified analysis could be tested with the observational data in future studies. On one hand, mutually exclusive coding categories in Study I could have distorted the analysis because the constructivist practices overlapped in the observed teaching. On the other hand, if this overlap had not been taken into account, it could have distorted analysis and interpretation in its own right. Studies II and III prompted more general-level cautions known from qualitative analyses, particularly those related to subjectivity and the interpretative nature of analytical choices. These challenges were tackled through researcher triangulation within the author teams, in which categorization was discussed together. Also, special attention was paid to the category systems' theoretical coherence (Morse, 2018). Different kinds of coding frameworks also could be used, yielding different insights from those in the present thesis.

The coding units between the part-studies varied, thereby also allowing for methodological triangulation regarding data analysis. Lesson episodes, critical teaching incidents, and topical units were used to segment the data, which then were coded (Mena & Clarke, 2015). This made it possible to examine the differing research questions and create complementary interpretations of the studied phenomena. However, propositional coding units were not utilized systematically in any of the part-studies. Propositional coding has proved to be a reliable and meaningful way to analyze entities, e.g., mentoring discussions, enabling a careful unpacking of detailed knowledge structures in teachers' practical knowledge (Mena & Clarke, 2015). This coding approach could be applied in the analysis of instructional reasoning in future studies.

4.4 Future research on teaching dynamics

In this thesis, the dynamic qualities of teaching practice were examined within teaching-studying activities and teacher thinking related to them (cf. Kansanen et al., 2000). Future research could connect this kind of approach with settings in which students' learning processes and outcomes also are examined, as is done, e.g., in

studies on optimizing the scaffolding of student learning (Kajamies, 2017; see also Gurung & Schwartz, 2013). In this way, the instructional and teaching-studying learning processes (Kansanen et al., 2000) could be covered as a whole. The perspective adopted in this thesis also focused on "teaching rather than teachers" (Hiebert & Morris, 2012). It was asserted that teaching's dynamic mechanisms penetrate teaching practice rather generally. In other words, dynamic qualities were conceptualized through cognitive-behavioral lenses, interpreting what teachers do and think in the context of their practice (cf., Clark & Peterson, 1986). However, this perspective could be turned around: Maybe the teachers – rather than the technical aspects of teaching – matter the most (Carr, 2003)? The teacher character has been analyzed previously, e.g., in terms of practical wisdom that cannot be separated from who teachers are (Carr, 2003). In the present work, teacher dispositions came closest to this kind of holistic perspective. Therefore, teacher dispositions could function as conceptual pathways through which cognitive-behavioral and characterological theorizations could be related.

Teachers' expert knowledge can be characterized broadly as practical theorizing (Loughran, 2019). Practical theories partly comprise theoretical propositions and are, in this sense, theoretical. However, in practical fields such as teaching, these propositions are organized so that they guide practical actions (Scheffler, 1985). Loughran (2019, p. 4) referred to the idea of how "*theories with (a) big T*" and "*theories with (a) small t*" can be separated, so that the former signifies theories based on formal knowledge and the latter signifies practice-based inferences that lead to practical theories. It is the latter that has been recognized as characterizing teachers' professional and practical knowledge (see also Clandinin & Husu, 2019). The focus of this thesis was rather strictly on the "practical" aspect of teachers' practical theories: Data sources comprised observations of teacher actions, as well as teacher interviews conducted closely in connection with teachers' classroom practice.

Future research also should incorporate more formal knowledge emphasis in the study of teaching dynamics, which I view as crucial, particularly in contexts in which the academic orientation toward teacher education is adopted, e.g., in research-based teacher education in Finland (Toom et al., 2010). *Teaching dynamics should be studied intensively in research-based teacher education settings in which student teachers are instructed on how to work with dynamic teaching mechanisms in their own practice, as well as systematically explore the dynamic features of their profession through structured reflection tasks during teaching practicums, other academic coursework in which teaching practice is conceptualized, and also in their own educational research.* In research-based teacher education programs, the practical, to a great extent, is explored through the theoretical, so the "theoretical" element of teachers' practical theories should be analyzed in more detail than what I

have done in this study. I also largely have omitted the broader philosophical paradigms surrounding teaching dynamics in this thesis. Teacher thought and action – i.e., teaching practice – never function outside of such a value-based and epistemological frame (Pring, 2015), so this philosophical framework also should be theorized further in research on teaching dynamics.

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