GENERAL INTRODUCTION

“Lesson Study focuses on helping teachers to develop the eyes to see children and how they respond and learn during research lessons.” (Lee, 2015, p. 103)
1. Introduction

Teachers are faced with a complex task to adapt their teaching to a diverse range of educational needs of students while at the same time having to meet the quality objectives as set by school boards and local or national governments (Jordan, Glenn, & McGhie-Richmond, 2010). As the first two decades of this century have demonstrated a global trend toward more inclusive practices in education, partly promoted through the implementation of inclusive education policies (UNESCO, 2009; 2017), classrooms in mainstream education have even become more heterogeneous in terms of students' (cultural) backgrounds, abilities and educational needs (Parsons et al., 2018; Suprayogi, Valcke, & Godwin, 2017). This also applies to mainstream secondary education in the Netherlands where the introduction of the Appropriate Education Act\(^1\) in 2014 required school leaders to integrate students with special educational needs in mainstream classrooms (Gubbels, Coppens, & De Wolf, 2018; OECD, 2016). These developments demand a high level of teacher adaptability (Parsons et al., 2018) and this often results in teachers being confronted with feelings of incapability to address the varying educational needs of students in a mainstream classroom situation (Dixon, Yssel, McConnell, & Hardin, 2014; Gehrke & Cocchiarella, 2013; Suprayogi et al., 2017). This applies particularly to teachers new to the profession who report a lack of differentiated teaching skills (OECD, 2016). In addition to this, teachers do not always feel supported by the school context in terms of its culture (Avalos, 2011), structural conditions (e.g., time and resources), and cultural conditions (e.g., support from school leaders and colleagues) (Gu & Day, 2013; Imants & Van Veen, 2010; Ingersoll, 2001; Ingersoll, Merrill, Stuckey, & Collins, 2018; Louws, Meirink, Van Veen, & Van Driel, 2017).

Though research shows that the most effective teachers are adaptive (Kyriakides, Creemers, & Antoniou, 2009; Parsons et al., 2018), teachers in the Netherlands, especially the ones new to the profession, appear to lack the necessary skills to “systematically assess students and differentiate their teaching” (OECD, 2016, p. 100). This is confirmed by the Dutch Inspectorate of Education (2018) who found that secondary education teachers only manifest sufficient adaptive teaching skills in less than half of the observed lessons. Particularly, planned adaptive teaching behavior was only evidenced in limited cases.

How teachers could be supported in delivering high-quality education to meet the diverse needs of students (Dixon et al., 2014), and how educational researchers can

\(^1\) The Appropriate Education Act, in Dutch Wet op Passend Onderwijs, was introduced in 2014 as an attempt to promote inclusive education practices. By a ‘Duty of Care’, this Act obliges schools in regional partnerships to make sure that every child is offered appropriate education suited to his or her capabilities.
subsequently determine whether this support leads to the intended results, are highly complex questions (Hill, Beisiegel, & Jacob, 2013). Effective teacher professional development may offer this necessary support to teachers (Desimone, 2009). Literature in this context (e.g., Borko, 2004; Desimone, 2009; Schleicher, 2016; Webster-Wright, 2009) points to a paradigm shift that has taken place over the last three decades where professional development activities were traditionally organized externally, toward a current focus on classroom-based collaborative professional development in professional learning communities (Vescio, Ross, & Adams, 2008). This concept of a professional learning community (PLC) is based on the assumptions that “knowledge is situated in the day-to-day lived experiences of teachers and best understood through critical reflection with others” and that “actively engaging teachers in PLC will increase their professional knowledge and enhance student learning” (Vescio et al., 2008, p. 81).

One increasingly popular professional development approach that can be characterized as a PLC (Chichibu & Kihara, 2013), is Lesson Study (LS) (Dudley, 2013; 2015; Hiebert & Stigler, 2017; Lewis & Perry, 2017). LS originated more than a century ago in Japan and has been spreading rapidly around the world from the moment it reached the United States in the 1990s (Dudley, 2015; Stigler & Hiebert, 2016). There is evidence that participating in LS has a positive influence on teachers’ beliefs in their own capabilities and their struggles to address students’ diverse educational needs (Puchner & Taylor, 2006; Xu & Pedder, 2015). Moreover, the explicit focus on student learning that is central to LS (Dudley, 2013) enables teachers “to develop the eyes to see children and how they respond and learn during research lessons” (Lee, 2015, p. 103). However, despite growing evidence of the potential impact of participating in LS on teachers’ beliefs, knowledge and behavior, as well as student learning (Xu & Pedder, 2015), there is only limited evidence of its impact on teachers’ beliefs of self-efficacy (Bandura, 1977), known as a vital predictor of teacher behavior (Summers, Davis, & Woolfolk Hoy, 2017), as well as teachers’ adaptive competence in inclusive practices (Norwich & Ylonen, 2013). It is furthermore argued that the school context is generally neglected in LS research as well, both in terms of the influence of the school context on professional learning in LS and, in turn, the potential influence of participating in LS on the school context (Hadfield & Jopling, 2016). As a result, this dissertation aims to examine the extent to which participating in LS influences teachers’ self-efficacy beliefs and their adaptive teaching competence, both in relation to each other and to the school context in which teacher professional learning takes place.
2. Conceptual framework

The following sections provide an overview of the key concepts that will be addressed throughout this dissertation. As the main focus of this dissertation is to examine the effectiveness of LS in the context of adaptive teaching, the concept of adaptive teaching competence is defined first. Subsequently, the role of teacher self-efficacy in this context is discussed, describing its impact on teacher behavior and student learning in turn. How these two concepts can be promoted through participating in LS, and what LS actually entails, is explained in the proceeding section. The last section of the conceptual framework discusses the school context in which LS is situated, referring to both the school culture and school conditions that promote or hinder professional learning of teachers.

2.1. Adaptive teaching competence

In their comprehensive literature review covering almost 40 years of international empirical studies on adaptive teaching, Parsons and colleagues conclude that “While there is consensus that effective teachers are adaptive, there is no consensus on the language to describe this phenomenon” (Parsons et al., 2018, p. 205). Given the variety of terms used to address students' different educational needs (Parsons et al., 2018; Suprayogi et al., 2017), ‘differentiated instruction’ is arguably most common in educational research (Deunk, Smale-Jacobse, De Boer, Doolaard, & Bosker, 2018; Smit & Humpert, 2012; Suprayogi et al., 2017; Tomlinson et al., 2003). This also applies to the Netherlands where ‘differentiated instruction’ and ‘differentiation’ are most frequently used although many teachers often wonder what these concepts actually entail and what is exactly expected from them in terms of catering for students' diverse educational needs (Dutch Inspectorate of Education, 2018). Despite this ambiguous use of labels, their definitions are mostly overlapping in that they refer to an overall approach to teaching that implies careful monitoring of students' progress and adaptive teaching in response (Deunk et al., 2018; Suprayogi et al., 2017).

In this dissertation, Corno’s (2008) rich description of adaptive teaching is followed to stress that addressing students' educational needs always takes place in a social and dynamic classroom context that requires flexible, spontaneous, and responsive teacher interventions as well as careful lesson planning and diagnosing of students' progress and needs. As such, adaptive teaching is generally informed by social-constructivist and social-cognitive theories (Corno, 2008; Maeng & Bell, 2015; Parsons et al., 2018), often referring to Vygotsky’s (1978) Zone of Proximal Development (Corno, 2008; Parsons et al., 2018; Randi & Corno, 2005; Smit & Humpert, 2012). These theories suggest that individuals construct knowledge best in a social context through interaction with others
and mediated by tools, and when it is adjusted to the learner’s appropriate learning zone (Vygotsky, 1978).

Throughout this dissertation, a distinction is made between adaptive teaching competence and adaptive teaching behavior. Drawing on the definition by Brühwiler and Blatchford (2011), adaptive teaching competence can be defined as “teacher’s ability to adjust planning and teaching to the individual learning needs of students” (p. 98). This ability requires in-depth pedagogical content knowledge (Shulman, 1986), diagnostic, instructional and classroom management skills (Brühwiler & Blatchford, 2011; Vogt & Rogalla, 2009), as well as a positive attitude toward addressing students’ educational needs (VanTassel-Baska & Stambaugh, 2005), which Corno (2008) refers to as an adaptive mindset i.e., to “value a diversity of talent in the collective” (p. 165). Adaptive teaching behavior, on the other hand, is more concerned with actual classroom activities and can be defined as carefully and proactively planning of the curriculum, teaching materials and learning activities, as well as flexibly responding to students learning needs in the social context of the classroom in order to reach the desired lesson objectives (Beltramo, 2017; Corno, 2008).

Adaptive teachers can respond to students’ educational needs by adjusting their teaching through explaining, questioning, encouraging, challenging, coaching, giving feedback, modeling, and (formative) assessing, in order for students to meet the intended learning objectives (Parsons et al., 2018; Smit & Humpert, 2012). Important to note is that when referring to students’ educational needs, the focus in this dissertation is demarcated to students’ learning needs (Deunk et al., 2018). This means that other perspectives on students' educational needs (e.g., focusing on students' behavior, learning, social-economic backgrounds, motivation, special educational needs etc.) are beyond the scope of this dissertation.

As mentioned before, the complexity of adaptive teaching in Dutch secondary mainstream education, even for experienced teachers, is apparent (OECD, 2016). What may arguably raise this complexity, is that teachers in Dutch mainstream secondary education often teach multiple groups of students during one week with only limited time to really get to know their students, whereas these “daily interpersonal interactions in classrooms are the building blocks of teacher-student relationships” and are associated with increased learning outcomes and motivation of students (Pennings et al., 2018, p. 41).

The review by Parsons and colleagues (2018) shows that the effects of adaptive teaching on students are generally positive, both in terms of academic achievements and non-academic measures such as student agency and engagement. However, other systematic reviews only report small to moderate positive effects, and sometimes even negative effects, on student learning depending on how the construct was operationalized.
(Deunk et al., 2018). Hence, it shows that this construct can be measured in a variety of ways although usually self-report or observation measures are used (Parsons et al., 2018).

The studies in this dissertation use a combination of these instruments. In chapter 2, adaptive teaching competence is measured with exit-interviews examining teachers’ beliefs and perceptions following a period of participation in LS. In the third and fourth chapter, mixed methods designs with stimulated recall interviews and observation instruments are used to capture adaptive teaching behavior before and after an intervention period in which teachers participate in LS.

2.2. Teacher self-efficacy

This section addresses the concept of teacher self-efficacy since “understanding how to teach diverse abilities is a challenge that teachers can meet successfully, especially if they have strong efficacy in their personal abilities as well as in their teaching abilities” (Dixon et al., 2014, p. 116). Rooted in social cognitive theory, Bandura (1977) described the concept of self-efficacy as a theory of human agency. The basic tenet of this concept implies that when people, regardless of the setting (Klassen, Tze, Betts, & Gordon, 2011), feel more confident in their abilities to execute certain types of behavior, the more likely this results in more active efforts to perform these intended behaviors, which eventually leads to improved performance (Bandura 1977; 1989). Not only does this apply to behavioral aspects, self-efficacy beliefs can also affect cognitive functioning as “The stronger people’s beliefs in their memory capacities, the more effort they devote to cognitive processing of memory tasks, which, in turn, enhances their memory performances” (Bandura, 1989, p. 1176). However, since people are not socially isolated autonomous agents (Bandura, 2012), this concept is embedded in a conceptual model of ‘triadic reciprocal causation’ (Bandura 1986; 1989; 2012), in which “human functioning is a product of the interplay of intrapersonal influences, the behavior individuals engage in, and the environmental forces that impinge upon them” (Bandura, 2012, p. 11). This becomes apparent in the four main sources of self-efficacy beliefs, i.e., mastery experiences, vicarious experiences (i.e., social comparing and modeling), social (verbal) persuasion, and people’s physical and emotional states (Bandura, 1977). Obviously, positive encounters with these sources of information most likely lead to positive performances whereas the opposite applies for negatively experienced sources of information (Bandura, 1977; 1989; Skaalvik & Skaalvik, 2007; 2010).

Soon after this concept made its appearance in 1977, it quickly reached education where it became known as teacher self-efficacy (TSE) (Klassen et al., 2011). From that point onward, the research base on TSE has grown rapidly even making some researchers argue that it “stands on the verge of maturity” (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998, p. 202). However, more than 20 years after this statement,
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the increasingly growing body of research on TSE has proven that this point is far from reached, hence consistently showing its relevance (Summers et al., 2017; Zee & Koomen, 2016). TSE refers to teachers’ confidence about their ability to influence student learning and can be defined as “teachers’ belief or conviction that they can influence how well students learn, even those who may be difficult or unmotivated” (Guskey & Passaro, 1994, p. 628). TSE is considered as “one of the key motivation beliefs influencing teachers’ professional behaviors and student learning” (Klassen et al., 2011, p. 21). Moreover, there seems to be consensus that TSE might be a vital predictor of teacher behavior (Künsting, Neuber, & Lipowsky, 2016; Summers et al., 2017; Tschannen-Moran & Woolfolk Hoy, 2001) as “teachers with an assured sense of self-efficacy set the tone for a high-quality classroom environment by planning lessons that advance students’ abilities, making efforts to involve them in a meaningful way, and effectively managing student misbehavior” (Zee & Koomen, 2016, p. 981-982).

Over time, empirical research with various TSE measures (Klassen et al., 2011; Tschannen-Moran & Woolfolk Hoy 2001) has consistently shown that higher levels of TSE are related to improved teachers’ instructional and classroom behavior (Klassen & Tze, 2014; Tschannen-Moran & Woolfolk Hoy, 2007; Zee & Koomen, 2016) as well as teachers’ well-being, job satisfaction and work engagement (Skaalvik & Skaalvik, 2007; 2010; Van der Want et al., 2019; Vieluf, Kunter, & Van de Vijver, 2013). Higher levels of TSE are also related to improved student achievement (Caprara, Barbaranelli, Steca, & Malone, 2006; Zee & Koomen, 2016) and student-teacher relationships (Summers et al., 2017), as well as a positive school culture and sense of community (Collie, Shapka, & Perry, 2012; Tschannen-Moran & Woolfolk Hoy, 2007). More specifically, previous research points to a potential connection between perceptions of the school context and feelings of self-efficacy (Geijsel, Sleegers, Stoel, & Krüger, 2009; Skaalvik & Skaalvik, 2010; Zee & Koomen, 2016).

In the context of adaptive teaching there is evidence that teachers with higher levels of self-efficacy tend to be more willing to address their students’ learning needs and that “teachers who had more professional development in differentiation, regardless of school, felt more efficacious in differentiating instruction in their classes” (Dixon et al., 2014, p. 123). This is consistent with research by Suprayogi, Valcke, and Godwin (2017), who report a clear relationship between higher levels of TSE and more positive attitudes toward adaptive teaching practices. Not only does this affect teachers’ willingness and attitudes toward adapting their teaching to students’ learning needs, self-efficacious teachers also tend to “use more diverse instructional strategies, differentiate more frequently, change their goals according to students’ needs, and are more positive about the implementation of such instructional strategies” (Zee & Koomen, 2016, p. 998).
In the context of LS only a few studies specifically relate TSE to LS practices and generally have an explorative, qualitative focus using field notes and interview measures (Chong & Kong, 2012; Puchner & Taylor, 2006; Sibbald, 2009). Given the importance of TSE in the context of (adaptive) teaching competence and since there is evidence that “self-efficacy beliefs can be developed through training or professional development settings” (Klassen & Tze, 2014, p. 73), the influence of participating in LS on TSE beliefs will be examined throughout this dissertation drawing on pre-test and post-test data.

TSE can be measured in multiple ways focusing on different dimensions or disciplines (Zee & Koomen, 2016). Despite the existence of a teacher efficacy measure for inclusive practices (Malinen et al., 2013; Malinen, Savolainen, & Xu, 2012), two studies in this dissertation (chapters 3 and 5) used a translated version of the well-known long version of the Teachers’ Sense of Efficacy Scale (TSES) (Tschannen-Moran & Woolfolk Hoy, 2001). The main reason for this is that this scale is believed to be superior to other TSE measures “in that it has a unified and stable factor structure and assesses a broad range of capabilities that teachers consider important to good teaching” (Woolfolk Hoy & Burke Spero, 2005, p. 354). Furthermore, it contains more items than the TSE measure for inclusive practices, arguably providing a more comprehensive picture of teachers’ self-efficacy, and also includes specific adaptive teaching items. The TSES treats TSE as a task-specific, three-dimensional construct addressing student engagement, instructional strategies and classroom management (Zee & Koomen, 2016).

### 2.3. Lesson Study

#### 2.3.1. Teacher professional learning through Lesson Study

To date, teacher learning can still be considered as a relatively new research discipline (Bransford, Brown, & Cocking, 2000) although it has undergone a “great deal of progress” in the last decades (Borko, 2004, p. 3). Where teacher learning before the 1980s was mainly concerned with off-site individual teacher professional development activities through workshops and courses delivered by experts, in the late 1980s, due to societal changes and “increased complexities in schooling”, teachers started “to turn to each other for professional learning, for a sense of direction, and for mutual support” (Hargreaves, 2000, p. 162). With this shift came the belief that in order to enhance teacher learning, teachers should not only gain ‘knowledge-for-practice’ (i.e., formal learning) or ‘knowledge-in-practice’ (i.e., practical knowledge), but also gain knowledge through generating “local knowledge of practice by working within the contexts of inquiry communities” (Cochran-Smith & Lytle, 1999, p. 250). This concept of learning in communities stems from the influential research on ‘communities of practice’ (Lave & Wenger, 1991; Wenger, 1998) and assumes that teacher learning should ideally be
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situated in the day-to-day context of the profession that enables social interaction around meaningful and genuine practices (Wenger, 1998).

In the subsequent years after the introduction of this concept, different types of communities emerged of which a ‘professional learning community’ (PLC) is arguably the most familiar (Giles & Hargreaves, 2006; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). A PLC can be defined as “a group of people sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learner-oriented, growth-promoting way” (Stoll et al., 2006, p. 223). Within a PLC, the use of data as a learning source is often integrated as well (Cochran-Smith & Lytle, 1999; Giles & Hargreaves, 2006).

Teachers who are part of a formal or informal PLC, often report more commitment and enthusiasm to teach (Levine & Marcus, 2010; Stoll et al., 2006), as well as higher levels of professional learning (Desimone, 2009; Garet, Porter, Desimone, Birman, & Yoon, 2001; Webster-Wright, 2009), and are “more likely to discuss problems, strategies, and solutions” (Opfer & Pedder, 2011, p. 385). Important in this context is that the concepts teacher professional learning and teacher professional development are often used alternately in literature without making a clear distinction (Vermunt, Vrikki, Van Halem, Warwick, & Mercer, 2019). However, it can be argued that teacher professional development entails a learning environment, a program, or an approach, whereas teacher professional learning focuses on processes and outcomes of teachers as “active agents” (Louws et al., 2017, p. 772) that may “change their professional knowledge, understanding, skills, and attitudes” (Vermunt et al., 2019, p. 62). As such, one of the critical differences may be that “professional learning requires teachers to be seriously engaged in their learning whereas professional development is often seen as merely participation” (Timperley, 2011, p. 5). Participating in professional development activities, such as a PLC, can therefore be perceived as a catalyst for active teacher professional learning provided that critical features are taken into account such as being active and collaborative, focused on content matter, coherent with teachers’ knowledge and beliefs as well as school policies, and covering a longer period of time (Desimone, 2009).

The increasingly popular professional development approach LS is believed to include these critical features (Lewis & Perry, 2014) and “it is clear at a glance that LS meets exactly these desiderata for professional learning communities” (Desforges, 2015, p. xviii). In essence, “LS is a deceptively simple” (Dudley, 2015, p. 5) collaborative professional development approach consisting of small groups of teachers who follow ‘inquiry cycles’ (Lewis, Perry, Friedkin, & Roth, 2012) of studying, designing, teaching, ‘live’ observing, and evaluating so-called ‘research lessons’ (Dudley, 2013). This classroom-based approach has a distinct focus on the improvement of student learning (Dudley, 2013; Lewis & Perry, 2015; Lewis, Perry, & Murata, 2006).
2.3.2. History and development of Lesson Study

LS has its origin in Japan where one of its first manifestations allegedly took place at Tokyo Normal School (currently known as University of Tsukuba) in 1872 and the first LS guidebook for teachers appeared in 1883 (Isoda, 2010). From that point onward, LS became deeply embedded in most Japanese schools at different levels (Lewis, 2015; Xu & Pedder, 2015). It took more than half a century until LS reached mainland China in the 1950s where it was implemented in schools in an adapted form, known as Chinese LS (Huang & Shimizu, 2016). Another four decades later, LS was introduced into the United States (US) partly as a result of the highly influential book *The Teaching Gap* (Stigler & Hiebert, 1999) which revealed that Japan scored consistently high on international comparative assessments due to its focus on problem solving skills and advanced mathematical thinking (Dudley, 2015). Soon after its appearance in the US, LS began to spread rapidly around the world and crossed the Atlantic Ocean where it first emerged in the United Kingdom (UK) in 2001 (Dudley, 2013; 2015). About a decade later, it subsequently moved to other European countries, such as the Netherlands (De Vries, Verhoeft, & Goei, 2016; Verhoeft, Tall, Coenders, & Van Smaalen, 2013).

Over the years, LS has arguably become one of “the world’s fastest growing approach to teacher learning” (Dudley, 2015, p. 4) and has been implemented in various national educational systems where it has been adapted to suit the different cultural contexts (Huang & Shimizu, 2016; Stigler & Hiebert, 2016). As a result, some researchers caution for adopting a too superficial or deviated form of LS losing its essential characteristics (Dudley, 2015) and highlight several misconceptions of the core components of authentic Japanese LS such as being focused on a measurable outcome in terms of a perfectly created product instead of the learning process itself (Fujii, 2014; Stigler & Hiebert, 2016; Takahashi & McDougal, 2016). Despite the various adaptations, a LS cycle consists of studying lesson and curriculum materials, planning a research lesson in detail, conducting the research lesson by one teacher from the LS team while the other team members observe the enacted lesson, followed by a post-lesson reflection in which observation data is shared and student learning is illuminated (Lewis et al., 2006). The UK model (Dudley, 2013) added an extra dimension to this by focusing explicitly on generally three or four so-called ‘case pupils’ who “represent or typify learner groups” (p. 110). In most LS models used in the US and the UK, revising and re-teaching the research lesson is an essential part of a LS cycle as well (Dudley, 2013; Lewis et al., 2006; Stepanek, Appel, Leong, Mangan, & Mitchell, 2007), whereas this is not common practice in Japan (Fujii, 2014; Takahashi & McDougal, 2016). Throughout this dissertation, the object of study is a Dutch LS model (Figure 1) that draws on the UK model by including this concept of ‘case pupils’ (De Vries et al., 2016). Within this model, variations may arise in terms of the (content) focus, data collection around ‘case pupils’, guidance by a LS facilitator, and
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the LS team composition. De Vries, Verhoef, and Goei (2016) describe these variations and contexts in a practical guide for LS in the Dutch context.

![Figure 1. Dutch LS model (De Vries et al., 2016) illustrating one LS cycle (adapted from Stepanek et al., 2007).](image)

2.3.3. Theoretical underpinnings of Lesson Study

In contrast to its counterpart Learning Study (Holmqvist, 2011; Ling & Marton, 2011; Pang & Marton, 2003), which can be understood as “a fusion” between LS and design experiments using variation theory as its guiding principle (Holmqvist, 2011, p. 497), LS research often lacks an underlying theory for explaining how teachers learn in LS contexts (Xu & Pedder, 2015). In the limited cases where clear references to underlying theories are made in LS research, a variety of theoretical perspectives have been used which could be clustered into “two broad schools” of cognitive theories and social-cultural theories, or a combination of both (Huang & Shimizu, 2016, p. 398). Two exceptions to this trend of “absence of the kinds of theoretical work necessary for explaining how and why teachers learn” (Xu & Pedder, 2015, p. 48) are worthwhile to mention. First, Lewis and her colleagues (Lewis, Perry, & Hurd, 2009) propose a theoretical model that is informed by
cognitive theories of teacher learning to make one’s learning visible as well as situated learning theories showing how participating in LS enables teachers to build norms and tools needed for instructional improvement and to strengthen professional communities. Second, the influential work of Dudley (2013) adopted a social-cultural framework focusing specifically on the use of different kinds of talk (Mercer, 2004) in the learning process of teachers in LS practices. It is argued that despite its long history in Japan, the theory behind LS has largely remained implicit because LS heavily depends on the context in which it is enacted and can therefore be seen as a cultural routine (Stigler & Hiebert, 2016). A recent approach to studying LS has been offered by Bryk and colleagues (Bryk, Gomez, Grunow, & LeMahieu, 2015) who argue that LS is a good example of improvement science which focuses on understanding LS “as it is implemented across a variety of settings and for a variety of goals” (Stigler & Hiebert, 2016, p. 586).

The studies in this dissertation perceive teacher learning through LS from a social-cultural perspective. However, given the focus on the influence of participating in LS on three individual outcome variables (teachers’ adaptive teaching competence, TSE, and perceptions of the school context), the adopted research designs, in particular the repeated measures designs in the third, fourth and fifth chapter, consider teacher learning from a more cognitive theoretical perspective.

### 2.3.4. Research on Lesson Study

There is ample and increasing evidence that participating in LS positively influences teachers’ attitudes and beliefs (Lewis et al., 2009; Puchner & Taylor, 2006; Xu & Pedder, 2015), as well as teachers’ knowledge, instructional skills, and the quality of teachers’ learning (Coenders & Verhoef, 2019; Leavy & Hourigan, 2016; Lewis et al., 2009; Vermunt et al., 2019; Vrikki, Warwick, Vermunt, Mercer, & Van Halem, 2017). LS is also believed to contribute to increased collegial support and creating PLCs in schools (Huang & Shimizu, 2016; Lee Bae, Hayes, Seitz, O’Connor, & DiStefano, 2016; Lewis et al., 2009; Lewis et al., 2006; Lieberman, 2009; Xu & Pedder, 2015). Following the theoretical model of Lewis and colleagues (2009), these “intervening changes” in LS (p. 286) should ultimately impact student learning.

An independent institution responsible for reviewing the quality of educational programs in the United States, the What Works Clearinghouse² (WWC), found that, out of 643 professional development studies related to K-12 Mathematics education in the US, only five studies met their evidence standards including two studies with significant positive effects on student math proficiency (Gersten, Taylor, Keys, Rolfhus, & Newman-Gonchar, 2014). One of these studies reported a randomized controlled trial experiment in the context of LS (Lewis & Perry, 2017).

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Despite this important evidence, most of the LS studies tend to adopt a qualitative and explorative research design (Lewis & Perry, 2014; Xu & Pedder, 2015). Moreover, only very limited evidence is available on the effects of participating in LS on teachers’ adaptive teaching competence (Norwich, Fujita, Adlam, Milton, & Edwards-Jones, 2018; Norwich & Ylonen, 2013), teachers’ beliefs of self-efficacy (Chong & Kong, 2012; Puchner & Taylor, 2006; Sibbald, 2009), and the school context (Lee Bae et al., 2016). The studies in this dissertation aim to provide evidence from both qualitative and quantitative measures to address the influence of participating in LS on teachers’ adaptive teaching competence, their TSE and their perceptions of the school context, as well as the relationship between these constructs.

2.4. The school context

As teacher professional learning is ideally situated in the school context (Borko, 2004), in collaboration with other professionals (Cochran-Smith & Lytle, 1999), the culture in which learning takes place and the conditions under which learning takes place, may determine the quality of professional learning and should therefore be taken into account (Louws et al., 2017; Tynjälä, 2008; Van Driel, Meirink, Van Veen, & Zwart, 2012). School cultures can be described in terms of schools’ social environments and refer to administrative as well as organizational structures, and how these interact in order to promote (or constrain) teacher professional learning (Avalos, 2011). Particularly promoting are school cultures in which teachers frequently share knowledge and experiences, and where teachers collaboratively work on developing classroom material and examine their practices (Desimone, 2009; Levine & Marcus, 2010; Little, 2012; Putnam & Borko, 2000; Van Driel et al., 2012). These cultures are often referred to as professional learning cultures (Hargreaves, 2000). Teachers who feel part of such a school culture report higher levels of commitment and enthusiasm to teach students (Levine & Marcus, 2010). However, in order to create or sustain a professional school culture, it is vital to take essential school conditions into account (Louws et al., 2017; Stoll et al., 2006).

In terms of school conditions, a distinction can be made between structural and cultural school conditions that can impact professional learning in schools (Imants & Van Veen, 2010). Structural conditions, for example, refer to experiencing sufficient time for work and continuous learning activities, accessibility to resources, workload, and organizational goals and policy. Cultural conditions, on the other hand, refer to support and guidance from school leaders, colleagues, and professional development coaches or facilitators, as well as the learning climate, having a shared vision, being involved in collective decision making, and the quality of collaboration between teachers (Louws et al., 2017). In particular, the essential role of supportive school leadership in promoting the quality of learning within these cultures is often stressed (Huffman & Jacobson,
2003; McLaughlin & Talbert, 2006; Sperandio & Kong, 2018). Not surprisingly, teachers who experience these conditions as supportive tend to report more positive learning outcomes, whereas the opposite is true for teachers who experience unsupportive school conditions; they may be hindered in their learning and practices (Opfer, 2016), or even leave the profession (Ingersoll, 2001).

In the context of LS research, the review by Xu and Pedder (2015) reveals that the most frequently mentioned conditions are facilitated time and leadership support. The authors argue that school leaders play an essential role in creating and maintaining a safe environment that promotes professional learning. Specific attention is also paid to involving a strong LS facilitator or ‘knowledgeable other’ (Takahashi, 2014b) who can guide the LS team forward (Perry & Lewis, 2009). In addition to evidence showing that the school context can influence LS practices, it is also believed that LS can contribute to building a professional learning community in schools (Lewis et al., 2009; Lieberman, 2009; Xu & Pedder, 2015).

However, since the school context is generally “under-theorized” in research on teacher professional development (Van Driel et al., 2012) and in LS research in particular (Hadfield & Jopling, 2016, p. 204), the first and last empirical studies in this dissertation focus particularly on the school context in relation to LS practices. This focus is twofold: in chapter 2 the school conditions that may promote or hinder teacher professional growth in terms of adaptive teaching competence are examined using exit-interviews, whereas in chapter 5 the focus is on the extent to which participation in LS influences teachers’ perceptions of the school culture and school conditions using pre-test and post-test questionnaires.

3. Theoretical model and general research question

This dissertation draws on the theoretical LS model of Lewis, Perry, and Hurd (2009) who illustrate how the LS features (i.e., investigation, planning, the research lesson, and reflection) result in intervening changes in terms of teachers’ knowledge and beliefs, their professional community, and teacher-learning resources. This, in turn, may lead to instructional improvement and, eventually, results in improved student learning. However, it is important to note that the route to teacher professional growth does not necessarily follow a strictly linear pattern, but could well have ‘alternative pathways’ in the ‘change environment’ where professional learning takes place (Clarke & Hollingsworth, 2002). De Vries, Roorda, and Van Veen (2017) adapted this model by supplementing it with a conditional part consisting of personal, interpersonal, LS related and school contextual conditions. The personal conditions in their model reflect teachers’ self-efficacy beliefs, attitudes, intentions, as well as knowledge and skills.
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As the studies in this dissertation are concerned with determining teachers’ professional growth over the course of their LS engagement, the focus is not only on how teachers developed as a result of participating in LS but also on the situation prior to participating in LS. As such, the conditional part, in terms of personal conditions, LS related conditions and school contextual conditions, is also addressed in this dissertation. For the purpose of this dissertation, the theoretical LS model by De Vries, Roorda, and Van Veen (2017) was specified using only the constructs that are central in this dissertation. The result is presented in Figure 2.

![Theoretical LS model](image)

*Figure 2. Theoretical LS model.*

The model illustrates the assumed interrelatedness of the different concepts that are addressed in this dissertation and how these constructs may be influenced by the LS features (presented in the blue box). The focus in this dissertation is on how LS influences teachers’ professional growth in terms of their (adaptive) teaching competence and their self-efficacy beliefs, both in relation to the school context, and the extent to which this leads to changes in the way teachers address students’ educational needs. How this eventually impacts student learning is beyond the scope of this dissertation, partly because the impact of professional development programs on student learning seems to depend on more than a one-year intervention period (Desimone & Stuckey, 2014). However, this variable is included in this theoretical model (presented in the dashed box) to illustrate that this would be the ultimate aim of participation in LS.

Following this theoretical model in Figure 2, the general research question guiding this dissertation is:

*To what extent does participation in Lesson Study influence teachers’ adaptive teaching competence, their self-efficacy beliefs, and the professional school culture, and, which school organizational conditions affect participation in Lesson Study?*
4. Research context

The studies in this dissertation are situated in the context of Dutch secondary education. In this context LS is still perceived as a relatively new professional development approach (De Vries et al., 2016; Van Halem, Goei, & Akkerman, 2016). However, due to an increasing amount of LS activities that unfolded over recent years in both practice and research, a group of five Dutch universities combined forces which led to the founding of a Dutch LS consortium ‘Lesson Study NL’ in 2016. In addition to jointly conducting research on LS, offering a LS facilitator training to educational professionals, and carrying out (the implementation of) LS activities in Dutch schools, this consortium organizes an annual LS conference and topical seminars for teachers, school leaders, policy makers, and researchers. Noteworthy, in 2019 three universities of this consortium are hosting the annual international conference of the World Association of Lesson Studies (WALS), that will take place in the Netherlands.

Against this background, the data that are part of the four studies presented in this dissertation stem from collaborative work between the university members of the LS consortium and their regional secondary school partners. As LS is still an emerging professional development approach in Dutch schools and most schools that implement(ed) LS are working closely with this consortium, data were mainly collected through convenience sampling. In total, the studies include data from 99 teachers who work at twelve mainstream secondary schools located in the western and northern part of the Netherlands. Table 1 presents an overview of the included schools and teachers per study. As will become clear, four of the twelve schools (#5 to 8) were included in all studies, four other schools (#9 to 12) were part of three of the four studies, and again four schools (#1 to 4) were only part of the first study. Teachers from the first study (chapter 2) could not participate in the consecutive studies due to its repeated measures design, whereas teachers in the second, third and fourth studies (respectively chapters 3, 4, and 5), could be part of the various studies.

3 http://lessonstudynl.nl
4 https://www.wals2019.com
5 http://www.walsnet.org
Table 1. Composition of included schools and teachers per study.

<table>
<thead>
<tr>
<th>School**</th>
<th>Study 1 (n)</th>
<th>Study 2 (n)</th>
<th>Study 3 (n)</th>
<th>Study 4 (n)</th>
<th>Total N per school**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IG</td>
<td>CG</td>
<td>IG</td>
<td>CG</td>
<td>IG</td>
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<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

\[ n = 26 \quad n = 22 \quad n = 37 \quad n = 26 \quad n = 37 \quad n = 23 \]

Total N = 22 \quad N = 48 \quad N = 63 \quad N = 60 \quad N = 99

Notes: **IG = Intervention Group. CG = Comparison Group. Na = not applicable.

The school number does not necessarily correspond to the school numbers mentioned in the various studies in this dissertation. Participating teachers are mostly overlapping in studies 2, 3, and 4. Therefore, the total sum of teachers per school is not necessarily the sum of the teachers per study.

In terms of demographics, eleven schools are located in (sub)urban areas in the western part of the Netherlands and can be considered as relatively average to large in terms of student population, ranging between ~800 and ~2100 students. One of these schools, however, is smaller in size and counts ~450 students. The remaining school is located in a rural area in the northern part of the country and can be considered as small with ~250 students. Five of the twelve schools are part of larger school associations that consist of a cluster of schools. These associations are often governed by an executive board of directors, but each school is under the direct control of a school principal. Depending on the school size and school philosophy, secondary schools often have an additional hierarchical layer of school department leaders who are responsible for managing a team of teachers.

Although school boards in the Netherlands experience extensive autonomy due to their relatively highly decentralized school system, principals and school department leaders (middle management team) are required to meet a required set of professional

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6 School information is retrieved from [https://www.scholenopdekaart.nl/](https://www.scholenopdekaart.nl/). This website is developed by the Primary and Secondary Education Councils in collaboration with Kennisnet, a Dutch organization funded by the Dutch Ministry of Education, Culture and Science, aiming to support schools in using ICT. The website includes data from national agencies such as the Dutch Inspectorate of Education.
competences and are encouraged to promote a culture of continuous professional collaboration and development within their schools (OECD, 2016). To support this, schools receive ‘lump sum’ funding from the Ministry of Education, Culture, and Science as well as “an additional amount for performance-oriented working and the professional development of teachers and school leaders” (OECD, 2016, p. 147). In practice, this amounts to at least 10% of teachers’ personal lump sum budget allocated for collective professional development purposes organized by the school, as well as an annual personal professional development budget of 83 hours and €600,- that allows teachers to make their own professional development plan (Dutch Council for Secondary Education, 2018).

Schools that are part of the studies in this dissertation used these funds to implement and organize LS activities in their schools. On top of this, some schools attracted extra subsidy funds to facilitate these processes more intensively. Seven of these schools, for example, were funded by the Dutch Ministry of Education as part of a three year project aimed at improving the collaboration between schools and university teacher training programs by applying LS.

Information about teachers’ background characteristics in terms of age, sex, education level, years of experience, and teaching subject area can be found in the separate studies throughout this dissertation.

5. Outline of this dissertation

Four different studies, each with a different focus and research approach, were conducted to answer the general research question guiding this dissertation. To illustrate this, Figure 3 presents a general overview of these studies and their focus. As becomes apparent in the general research question, each study is closely linked to LS (hence displayed in blue) and together the studies examine whether participation in LS influences teachers’ adaptive teaching competence, their self-efficacy and the professional school culture, and which conditions in the school context affect participation in LS. The subsequent chapters focus on different aspects of the general research question.
Chapter 1

Figure 3. General overview of this dissertation.
Chapter 2 presents a qualitative study that focuses on two elements of the general research question. Firstly, it explores to what extent participation in LS enhances teachers’ adaptive teaching competence in terms of their knowledge, beliefs and attitudes about students’ educational needs, and how teachers (try to) address these needs in daily practice as a result of LS. Secondly, this explorative study also examines which structural and cultural elements in the school context play a role in promoting or hindering teachers’ professional growth in terms of adaptive teaching competence. The study draws on semi-structured interview data from 22 teachers working at eight different secondary schools who were involved in LS for at least one year. The Interconnected Model of Professional Growth (Clarke & Hollingsworth, 2002) is used as an analyzing framework and will be tested on its applicability in the context of LS. The explorative focus of this study contributes to knowledge about adaptive teaching competence and the influence of the school context in LS practices.

As LS has mainly been researched through small-scale, qualitative studies (Lewis & Perry, 2017), the consecutive studies rely on (mixed methods) quasi-experimental designs to determine whether LS impacts teachers’ beliefs and behavior as well as the professional school culture.

Chapter 3 focuses on the influence of participating in LS on teachers’ self-efficacy beliefs, their (adaptive) teacher behavior, and the relationship between these constructs. The study includes 48 teachers from eight different schools, of which 26 teachers constitute the intervention group. Using a relatively unique research design in the context of LS, TSE questionnaires, stimulated recall interviews, and observation instruments were used prior to and following the LS intervention. This study is one of the first in the context of LS using a mixed methods quasi-experimental design focusing on teachers’ self-efficacy beliefs and adaptive teaching behavior in the context of LS.

Chapter 4 reports of a study with a similar research design as in the previous chapter, in this case drawing on data from 63 teachers of which 37 are intervention group teachers. However, where the previous study uses a broad scope focusing on both teachers’ beliefs of self-efficacy and different types of teaching behavior, including adaptive teaching behavior, the study in this chapter focuses more specifically on the influence of participating in LS on teachers’ intentions and perceptions toward their adaptive teaching practices as well as their adaptive teaching behavior. As such, this study is solely concerned with the second part of the general research question focusing on elements of adaptive teaching competence. Stimulated recall interview data were combined with data from two observation instruments, of which one was specifically constructed and validated for the purpose of this study. By combining these instruments, and following notions that literature is ambiguous about the definition of adaptive teaching
Chapter 1

(Suprayogi et al., 2017), this study also addresses a more conceptual question whether we define and measure adaptive teaching behavior in a valid way.

The last empirical study, in chapter 5, focuses on the influence of participating in LS on the professional school culture and school conditions as there is evidence that LS may enable professional learning communities in schools (Xu & Pedder, 2015). Given the potential link between the school context and teachers’ self-efficacy beliefs (e.g., Geijsel et al., 2009), this study also examines the influence of participating in LS on teachers’ self-efficacy beliefs and the relationship between these beliefs and the professional school culture and school conditions. The study reports about pre-test and post-test questionnaire data from 60 teachers, of which 37 intervention group teachers.

Finally, chapter 6 contains a general conclusion of this dissertation addressing its contribution to science and implications for practice, but this chapter also provides a critical discussion of this dissertation and directions for future research.