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Chapter 1

Introduction

1.1 Introduction

School systems are not always successful in engaging students to maximize their performance. In the Netherlands this results in students aiming to achieve well enough to pass on to the next grade instead of aiming for higher achievements in subjects where this is possible for them (Westenberg, 2011; Westenberg & Van Driel, 2012). This problem has been recognized by the Dutch government, which provided extra funds for initiatives to stimulate student talent development (Dekker, 2013). The idea is that all students should get the opportunity to achieve to their maximum (Westenberg, 2011; Westenberg & Van Driel, 2012). Teachers have an important role in accomplishing this talent development. They can use differentiated instruction (DI) as a pedagogical approach to maximize each students' learning potential (Tomlinson et al., 2003). Several studies, covering a long period of time, have shown that when teachers differentiate their instruction tailored to students' individual learning needs, students' motivation, achievement, and engagement may increase (e.g., Deunk, Doolaard, Smale-Jacobse, & Bosker, 2015; Maeng & Bell, 2015). However, DI is a much debated topic in the educational literature and practice: Although it appears to be important for students, it is difficult for teachers to apply DI in their daily teaching practice (e.g., Dutch Inspectorate of Education, 2016; Tomlinson et al., 2003). Many attempts have been made over the years to help teachers practice DI, but it remains a (pedagogical) approach that teachers have difficulties with (e.g., Graham et al., 2008; Roiha, 2014). Teachers make only minor, if any, adaptations. Those adaptations are often not aimed at all students, but at specific groups, often the low achieving students. Examples of

such minor adaptations are expecting individual accomplishments in individual tasks, providing individual support, and assigning students presentations and projects in which the students have autonomy regarding the specific topic (Graham et al., 2008; Roiha, 2014). The reasons teachers give for limiting their efforts to these minor adaptations are a lack of time, resources, and materials, hindering physical classroom settings, and large class sizes (Roiha, 2014). Teachers view DI as an approach in which they have to make individual lesson plans for all students (Janssen, Hulshof, & Van Veen, 2016); however, with large classes, this requires time they do not have.

To stimulate teachers to implement DI, policies have been put into place (e.g., Mills et al., 2014; Valli & Buese, 2007); to then support teachers in the implementation of DI, professional development trajectories (PD trajectories) have been set up (e.g., De Jager, 2013; Valli & Buese, 2007). However, both these policies and the PD trajectories often failed to produce the desired results. For example, Valli and Buese (2007) found in the US that diversity in classrooms increased as a result of several federal, state, and local policies. PD trajectories were then provided to help teachers cope with the increasing diversity through use of DI. Although teaching practices did change, the changes were confined to grouping students in small teaching-learning groups, and did not evolve beyond that. In the design of these policies and PD trajectories, teacher characteristics such as knowledge, perceptions, and beliefs about DI, and the realities of their classroom practices, are often overlooked (Janssen, Westbroek, Doyle, & Van Driel, 2013). In many cases, teachers consider the policies and PD trajectories impractical, since they feel the ideas behind these initiatives are too far removed from actual classroom practice. Hence, DI initiatives will not or will only partly be adopted (Janssen, Westbroek, Doyle, et al., 2013). On the other hand, positive results have also been observed in these implementation processes (e.g., Hertberg-Davis & Brighton, 2006; Tomlinson, Brimijoin, & Narvaez, 2008). This

occurred especially when the whole school is involved in the change, even the school administrators. When the principal, for example, provided teachers with a safe and secure environment for change and believed in the teachers' ability to change, change was more likely to happen than when the principal was not supportive (Goddard, Neumerski, Goddard, Salloum, & Berebitsky, 2010; Hertberg-Davis & Brighton, 2006). However, these were either small-scale studies with an elaborate report on how implementation in that specific case came to be (Anderson, 2007; Levy, 2008), or larger studies that did not elaborate on what specifically caused those positive results (e.g. Goddard, et al. 2010). In addition, most research that has been done on DI was focused on how to implement it, whether implementation worked, and what the effects on students were (e.g., Deunk et al., 2015; Mastropieri et al., 2006; Tomlinson et al., 2003). Thus, research has shown that teachers do have knowledge about DI, but that most of the time they do not implement it in classroom practice (Brighton, 2003; Roiha, 2014). However, it appears that how knowledge of DI becomes classroom practice has barely been explored. Also, a teacher perspective is often missing in research on DI: what they already know and do, attempt to do and why, and what in their working environments influences their knowledge and practices.

In the current dissertation, the focus is on the teacher perspective with the aim of contributing to a more detailed understanding of what happens to teachers when they are asked to practice DI in the context of an innovation named GUTS (Gedifferentieerd Uitdagen van Talent op school, meaning Differentiated Challenging of Talent in School; see section 1.4). To achieve this goal, we first explored the literature to investigate the influence of the teacher's daily work environment on the implementation of DI. Then, in two empirical studies, we looked in more detail at the choices teachers make regarding DI during practice, by exploring their interactive cognitions of DI in their regular and their

GUTS lessons. Finally, we explored teachers' sense-making processes during GUTS lessons. In taking this perspective, we aimed to contribute to the literature on DI and teacher knowledge, but also to help promote the implementation of DI and teachers' professional learning regarding DI.

1.2 Differentiated instruction

1.2.1 *Differentiated instruction within classrooms*

Differentiated instruction (DI) is a pedagogical approach in which teachers (proactively) aim to maximize each student's learning potential (Subban, 2006; Tomlinson et al., 2003). To maximize the learning potential of each individual student, teachers take account of differences in the students' learning needs in the process, content, and product of instruction. The students' learning needs can be divided into the three main student characteristics Tomlinson, a leading researcher on the subject of DI, identified as the students' readiness, interest, and learning profile (Tomlinson et al., 2003). The students' *readiness* can best be described by referring to Vygotsky's (1978) zone of proximal development (ZPD). The ZPD is the zone where a student achieves while experiencing minor challenge. This means that the student cannot yet achieve alone at that level, but needs guidance from a teacher, peer, or parent. When teachers take each student's *readiness* into account, it means that they try to teach each student through his/her ZPD. When teachers take account of a student's *interests*, student engagement is likely to be enhanced, and intrinsic motivation will increase (Tomlinson et al., 2003). A student's *learning profile* is the student's preferred mode of learning, and can be influenced by several characteristics such as learning preferences (the ways students prefer to learn), gender, and culture (Tomlinson et al., 2003). In this definition of DI with its specific distinction between the three student characteristics, influences on how students learn such as a student's cultural background are part of the category *learning profile*. However,

especially in current times with a high level of cultural diversity in schools, several researchers argue that it is important to intentionally address students' diverse cultural backgrounds rather than as part of a larger pedagogical approach addressing all kinds of differences between students (Cohen & Lotan, 1995; Santamaria, 2009; Severiens, 2014). These researchers make a distinction between DI as described by Tomlinson et al. (2003), which puts relatively more emphasis on differences between students' cognitive traits (academic DI) and DI that emphasizes creating equal status relationships between students by addressing their cultural backgrounds (cultural DI). The argument is that, from a social justice perspective, Tomlinson et al.'s (2003) definition of DI does not delve deeply into issues of cultural inequality and the influence the students' different cultural backgrounds and home situations have on the learning environment (Severiens, 2014). *Academic* and *cultural* DI can be seen as complementary perspectives on student learning, since they both aim to maximize students' learning potential and learning outcomes. *Academic* DI focuses firstly on interaction between the teacher and his/her individual students' talents and the variety in learning opportunities that should be offered to those different students in order to develop those talents to the fullest (Severiens, 2014). While *cultural* DI is more about the inequality that exists in classrooms as a result of the students' different cultural backgrounds and the teacher primarily attempting to incorporate those into his/her teaching to make sure all students feel addressed (Santamaria, 2009; Severiens, 2014). Moreover, in Tomlinson et al.'s (2003) *academic* DI there is more focus on students' performance, motivation, and learning preferences and in *cultural* DI there mainly is a focus on imposing equal status on all students. This latter can be considered similar to teaching for equity as described by Cohen and Lotan (1995). Since the research described in this dissertation focuses on the innovation GUTS in which teachers were encouraged to differentiate their instruction in order to further develop students'

(academic) talents, we adhered to Tomlinson et al.'s (2003) definition of *academic* DI.

Ideally, DI meets six hallmarks, according to Tomlinson et al. (2003). They state in their literature review that instruction can be called DI when it: (1) is proactive, rather than reactive. DI is thus preferably planned beforehand; (2) uses flexible grouping practices. Small teaching-learning groups are formed and the teacher chooses flexibly between heterogeneous and homogeneous groups; (3) varies in use of materials. The lesson materials can differ per student, according to their learning needs; (4) is flexibly paced. The teacher flexibly adapts his/her pace of instruction to the needs of the different students; (5) is learner-centered. Instruction thus focuses on getting each student ahead; and (6) is knowledge-centered. The teacher ensures that every student understands the subject matter. This *effective* DI that Tomlinson et al. (2003) describe can also be seen as divergent DI (Bosker & Doolaard, 2009). In divergent DI, teachers aim to get as much out of every student as possible, and the teachers' attention is divided more or less evenly between students. This is opposed to convergent DI, where a teacher sets minimum goals that each student should reach (Bosker & Doolaard, 2009). This means that students who achieve well and reach the minimum goals with more ease than lower achieving students often get less attention in class from the teacher than those lower achieving students (Bosker & Doolaard, 2009). Though both types of DI seem opposites, they do not necessarily exclude each other in teachers' classroom practices (Denessen, 2017; Severiens, 2014); teachers can choose every time they decide to take students' needs into account in their teaching, to do this convergently or divergently.

1.2.2 Between-classroom differentiation

DI can take place between and within classrooms. In countries like the Netherlands, where students in secondary education are placed in

different educational tracks, based on achievement, DI takes place between classrooms (Bosker & Doolaard, 2009). In secondary education in the Netherlands, students are tracked several times during their school career. After primary education, around age 12, students are placed in one of three main tracks: pre-vocational secondary education (VMBO), senior general secondary education (HAVO), or pre-university education (VWO). Halfway through their secondary education, students are tracked further, now mainly according to their interests, in combination with their achievements. Students choose a profile based on what they think they will want to study after secondary education. A profile is made up of a set of subjects that offer a student the opportunity to specialize in one of four disciplinary areas: Culture and Society, Economy and Society, Nature and Health, Nature and Technology. The choice for one of the four profiles is based partly on achievement: they consider what subjects they are good at and what would thus be a sensible choice. Students' choice is also based on their interests: they decide what subjects they like and want to receive more education in. In sum, in the Netherlands, between-classroom DI focuses on taking the readiness and interests of groups of students (as opposed to individual students) into account.

In countries where tracking of students occurs, teachers often do not see a need for DI within classrooms (Bosker & Doolaard, 2009), although diversity in the classes is still high (Deunk et al., 2015). However, research into the effects of successful within-classroom DI on students' learning outcomes has found positive results (Deunk et al., 2015; Maeng & Bell, 2015). Specifically, students' engagement and achievement appear to increase when their learning needs are taken into account (Mastropieri et al., 2006; Richards & Omdal, 2007).

1.3 The teacher perspective on differentiated instruction

1.3.1 Implementation of differentiated instruction in practice

In many studies that report the (results of) DI in classrooms, grouping students is the most commonly observed way to differentiate instruction (Deunk et al., 2015; Tomlinson, 2015). Teaching-learning groups can be made based on different student characteristics, like their achievements or interests (Deunk et al., 2015; Subban, 2006; Tomlinson et al., 2003). Students with the same achievement levels and interests can be grouped together in homogeneous groups, but students in the same group can differ on these characteristics in heterogeneous groups. Ideally, the teacher makes flexible use of these different ways of grouping students (Tomlinson et al., 2003). A possible reason many teachers use grouping as a DI method is that it is easier to implement in practice than planning how to instruct each student in an individually preferred way. In secondary education, teachers teach at least five different classes of 25-30 students a day (Janssen, Westbroek, Doyle et al., 2013). Teachers believe that because DI should be planned proactively, an individualized lesson plan for every student needs to be made. With so many students a day and only 15 minutes planning time per lesson, DI seems impossible to implement (Janssen et al., 2016). Teachers consider DI to be an impractical approach, for it lacks congruence and instrumentation, and is high in costs (Janssen, Westbroek, Doyle et al., 2013). For DI to be *congruent* with a teacher's practice, there should be a proper fit between DI approach and the already existing classroom practices; thus it should not require drastic changes (Janssen et al., 2016). An approach to DI is *instrumental* when it provides clear practices or procedures that prescribe what to do to effectively differentiate instruction (Janssen et al., 2016; Rubenstein, Gilson, Bruce-Davis, & Gubbins, 2015). The *cost* of an approach to DI should not be too high; this is the case when the approach is efficient for the teacher and the teacher can expect a return that is in balance with his/her efforts (Janssen et al., 2016). Besides the

impracticality, teachers feel that the regular classroom situation constrains proper experimentation and implementation of DI (e.g., Roiha, 2014; Roy, Guay, & Valois, 2013). At the end of each school year teachers are expected to have taught each student a certain curriculum, or particular subject matter (McTighe & Brown, 2005; Severiens, 2014). In order to do so, teachers often feel they should stick as much as possible to the regular lesson method. Because of its impracticality, DI is, apart from the grouping practices teachers often use, a little-observed approach in everyday classroom practice (Janssen et al., 2016; Subban, 2006). Teachers prefer to teach to the middle and adjust their instruction to the middle-achieving students (Subban, 2006). Also, when teachers use DI methods, they often use a small range of different methods and stick to that (Graham et al., 2008; Roiha, 2014; Roy et al., 2013).

It thus appears that, despite the many years of research into DI and the attempts to implement it, DI is a difficult approach to implement in practice. For that reason, professional development trajectories are being undertaken to support teachers in learning ways to use differentiated instruction (e.g., Bianchini & Brenner, 2010; VanTassel-Baska et al., 2008). However, as mentioned above, those PD trajectories often do not have the desired results; DI is often not implemented as was intended by the trajectories. For example, Bianchini and Brenner (2010) investigated an induction program for beginning teachers. In this induction program special attention was paid to the implementation of DI. Whether the beginning teacher implemented DI was not only decided by that induction program: Bianchini and Brenner (2010) showed how one teacher who began teaching in a school very supportive of DI did indeed implement DI in her lessons, whereas another beginning teacher, who was not supported by her school or her mentor to implement DI, did not implement it. Beecher and Sweeny (2008) and VanTassel-Baska et al. (2008) found positive results on the implementation of DI. However,

their studies were longitudinal studies, with teacher participation in PD trajectories for several years and involvement of the whole school. Changes were visible after eight and three years, respectively. DI is not an approach that is implemented in a short period of time, nor is it likely to be implemented sustainably when the whole school is not involved in a complete change of approach (Severiens, 2014; Tomlinson et al., 2003; Tomlinson et al., 2008). Consequently, it is possible that other factors are at play that influence whether what is learned in a PD trajectory is implemented in practice, and that a step-wise and longitudinal change is necessary (Severiens, 2014).

Schools do not attempt to move towards greater use of DI simply for the sake of change (Tomlinson et al., 2008). DI increases student outcomes, and that is what schools wish to achieve. However, with many change initiatives, there is a general idea of how to increase those outcomes (e.g., through DI), but an explicit theory of improvement is often lacking. A theory of improvement provides an elaborate explanation of what should change in practice and how (Van Veen, Zwart, Meirink, & Verloop, 2010; Wayne, Yoon, Zhu, Cronen, & Garet, 2008). The lack of such a theory of improvement could mean that different context and teacher characteristics influencing teaching practice are not taken into account in the design of an innovation, which could in turn influence implementation as described above.

In this dissertation, we use a teacher perspective to pay attention to those different factors that influence teachers' practices in the implementation of DI.

1.3.2 Teachers' interactive cognitions regarding differentiated instruction

As mentioned above, teachers consider proactive DI difficult to implement. However, even if a teacher plans for proactive DI, situations will arise in class that the teacher needs to respond to (Denessen & Douglas, 2015). During teaching, teachers thus need to make choices regarding the students' needs they are taking into

account, which means that reactive DI will always be present in classroom teaching. Much of the research into (reactive) DI has focused mainly on teachers' knowledge and beliefs about DI, their observable practices, and student outcomes in order to draw conclusions about the teachers' implementation of DI (e.g., Brighton, 2003; Deunk et al., 2015; Graham et al., 2008; Mastropieri et al., 2006). However, there is a reciprocity between teachers' cognitions and insights and their activities in the classroom regarding (reactive) DI that can only be explored by paying attention to the teachers' knowledge of DI *during* teaching (McAlpine, Weston, Berthiaume, & Fairbank-Roch, 2006; Munby, Russell, & Martin, 2001; Verloop, Van Driel, & Meijer, 2001). This practical knowledge of teachers is the knowledge that is embedded within their practices, and it can be considered to consist of two components: (1) knowledge and beliefs; and (2) interactive cognitions (Meijer, Verloop, & Beijaard, 2002). Teachers' knowledge and beliefs are the more normative knowledge and beliefs about what is important to teach and how students' learning should be promoted; these are the cognitions teachers have *about* their practice (Meijer, 1999). Teachers' knowledge and beliefs influence the cognitions that they (un)consciously have during the teaching itself, their interactive cognitions (Meijer, 1999; Verloop, 1989; Verloop et al., 2001). Teachers' interactive cognitions are present *during* practice (Meijer, 1999; Verloop, 1989). What happens in classroom practice in turn shapes the teachers' interactive cognitions, because these cognitions are embedded in the teachers' practices. Interactive cognitions are thus dynamic (Meijer et al., 2002).

Because interactive cognitions are personal in nature and occur in a teacher's mind during teaching, they are difficult to investigate. Think-out-loud protocols are often used to investigate thoughts (Meijer, 1999; Nguyen, McFadden, Tangen, & Beutel, 2013); however, this is not possible during teaching. Therefore, stimulated recall interviews (SRIs) are frequently used when investigating teachers'

interactive cognitions during teaching. In SRIs, teachers are first observed while teaching. During the observations, video recordings are made, which are shown to the teachers in an interview shortly after the observation (McAlpine et al., 2006; Meijer, 1999; Nguyen et al., 2013; Verloop, 1989). During the interview, the teachers watch their own teaching and explain what they were thinking during several teaching actions. The teachers' explanations of their thinking-in-action are considered to be expressions of their interactive cognitions (Meijer, 1999; Nguyen et al., 2013; Verloop, 1989).

The embeddedness in practice and the dynamic nature of interactive cognitions make these a complex teacher characteristic to capture. However, merely examining practices and knowledge as two separate entities will not provide a complete picture of what happens in classrooms when teachers aim to differentiate their instruction (McAlpine et al., 2006). Therefore, in this dissertation, with its focus on the teacher perspective on DI, we investigated teachers' interactive cognitions. More specifically, we focused on what student characteristics teachers take into account when interacting with students and how they do that (Denessen & Douglas, 2015).

1.3.3 Sense-making of an innovation aimed at increasing DI

In most of the above-mentioned studies, the implementation of DI was dealt with as the implementation of an innovation (e.g., Puzio, Newcomer, & Goff, 2015; Smit & Humpert, 2012). Research into the implementation of educational innovations has shown that implementation diverting from the original plan is not a phenomenon that is typical for the implementation of DI (März & Kelchtermans, 2013; Van Veen et al., 2010). Each school and each teacher has individual characteristics that influence how an innovation is received by the teachers within a school. This causes actual implementation to differ from intended implementation, especially when the innovation lacks an explicit theory of improvement (Van Veen et al., 2010; Wayne

et al., 2008). Differing implementation can be interpreted in two ways: as a rejection of the innovation, or as describing the process of the teachers positioning themselves within the innovation (Ketelaar, Beijaard, Boshuizen, & Den Brok, 2012; Luttenberg, Van Veen, & Imants, 2013; Spillane, Reiser, & Reimer, 2002). In line with Luttenberg, Van Veen et al. (2013) and Spillane et al., (2002), we believe that regarding the actual implementation as a rejection of the intended implementation does not do justice to the effort teachers put into the implementation process. It is, therefore, preferable to consider teachers' handling of the innovation as a process of sense-making. Teachers' sense-making processes typically commence when they are confronted with new external expectations (Luttenberg, Van Veen, et al., 2013; März & Kelchtermans, 2013; Spillane et al., 2002). Sense-making can be seen as a dynamic process in which teachers obtain coherence between their own personal frames of reference (their knowledge, beliefs, and practices) and their perceptions of the new external expectations (the perceived situational demands). Sense-making is a dynamic process since it influences both the teachers' personal frames of reference and the innovation. Luttenberg, Van Veen, et al. (2013) described four types of search for meaning teachers can go through: (1) assimilation, when there is a match between the personal frame of reference and the perceived situational demands, and the teacher fits the situational demands within his/her personal frame of reference; (2) accommodation, when there is a match between the personal frame of reference and the perceived situational demands, and the teacher fits his/her personal frame of reference within the situational demands; (3) toleration, when there is a mismatch between the personal frame of reference and the perceived situational demands, and the teacher adheres to the situational demands and maintains his/her frame of reference; and (4) distantiation, when there is a mismatch between the personal frame of reference and the perceived situational demands, and the teacher discards the situational demands.

In addition to describing the teachers' sense-making processes as types of search for meaning, sources of ambiguity and uncertainty can be used to further specify the complex process that teachers go through (Allen & Penuel, 2015; Weick, Sutcliffe, & Obstfeld, 2005). Teachers will experience sources of ambiguity and uncertainty when they are confronted with an innovation and they have no obvious ways to engage in that innovation, because it presents them with a new situation. The sources of ambiguity and uncertainty can refer to teachers' not completely agreeing with the practices they have to implement, lacking proper and sufficient resources for these practices (ambiguity), or not understanding well enough what is expected of them (uncertainty) (Allen & Penuel, 2015). Sources of ambiguity and uncertainty include limited resources, conflicting goals, and role ambivalence.

The research described in this dissertation took place as part of the GUTS project (see 1.4). This project can be seen as an innovation that aimed to stimulate teachers to practice DI. Considering the difficulties that are often experienced with the implementation of DI, we examined the teachers' sense-making of DI in the context of GUTS and, more specifically, whether and how teachers' sense-making in relation to this innovation changed over time.

1.4 GUTS

The empirical studies in this dissertation were conducted in the context of GUTS (Gedifferentieerd Uitdagen van Talent op School, meaning Differentiated Student Talent Development). The primary aim of GUTS was to challenge students in the lower grades of secondary education and give them chances to discover their talents; this was expected to result in increased motivation for school and achievement (Westenberg & Van Driel, 2012). To achieve the main goal of GUTS, teachers were encouraged to practice DI. Both the influences of GUTS on students and on teachers were studied in two separate doctoral

research projects. In the current dissertation, we focused on the teachers. In the PhD research project that took place parallel to the research described in this dissertation, students' perceptions of GUTS and the influences of GUTS on students' motivation and achievement were studied (Wijsman, 2018).

For the current dissertation GUTS was an interesting context to study influences on teachers' implementation of DI, their interactive cognitions of DI, and their sense-making of GUTS lessons, since: in GUTS the whole school was involved (Tomlinson et al., 2008); the teachers got a lot of freedom (De Neve, Devos, & Tuytens, 2015; Schmidt & Datnow, 2005); it was disconnected from the regular curriculum (McTighe & Brown, 2005); and teachers taught more homogeneous groups of students (Janssen et al., 2016; Janssen, Westbroek, Doyle et al., 2013).

The innovation was designed in cooperation between university researchers and a secondary school in the Netherlands that provides bilingual general secondary education (HAVO) and bilingual pre-university education (VWO). Bilingual education means that the school offers lessons in the three lower grades through English, except from the language classes which are offered in regular form. The school can be typified as an innovative school, where often innovations are commenced, like implementing working on laptops during class, Chinese language lessons for all lower grade students, and recently GUTS. The implementation process of GUTS started in the school year 2013-2014 and continued for three years. During those years, teams from both institutions met regularly and discussed and evaluated the innovation. When necessary, at the start of each school year, (minor) changes would be made to optimize GUTS.

Students received several extra lessons (GUTS lessons) in a subject they liked and were already achieving well in; this latter was decided to be the case when students had a mean grade of seven for

that subject¹. Each student chose at several points during the school year what subjects they wished to follow during the GUTS lessons. In the first year, this project took place, the 7th grade students chose at three points and received two GUTS lessons in subject one, and four GUTS lessons in subjects two and three. In the second and the third years of GUTS, students chose a subject each semester and received approximately eight lessons per subject. At each point when students had to give their preferences for the subjects to receive GUTS lessons in, they selected three subjects and were given one of these. For organizational reasons, it was impossible to give each student their number one choice.

The GUTS lessons that the students followed were designed by the teachers. The teachers were free in the content and specifics of the lessons, since they did not have to fit within the regular curriculum. However, the lessons did have to be related to the regular curriculum, since students needed to be able to transfer what they learned during the GUTS lessons to the regular lessons in order to achieve better during those. In addition, teachers had to make sure the lessons met four criteria: (1) they had to provide *enrichment* for the students in addition to their regular subject-matter; (2) students should be able to experience *autonomy*; (3) *higher order learning*, according to Bloom's taxonomy, had to be stimulated; and (4) the teachers should *differentiate* their instruction during the lessons. Although the GUTS lessons had to meet all four criteria, teachers were specifically requested to differentiate their instruction in the lessons. Because in GUTS the teachers did not have to follow the regular curriculum, because student groups were more homogeneous than in the regular lessons, and because the whole school was involved, it was considered a context in which they could experiment with DI (De Neve et al., 2015;

¹ In the Netherlands students are graded between one and ten on tests, where one means very poor achievement, and ten excellent achievement

Janssen, Westbroek, Doyle et al., 2013; McTighe & Brown, 2005; Tomlinson et al., 2008).

1.5 Overview of the chapters

In this dissertation, we have conducted a literature review and three empirical studies within the context of GUTS. Within these studies, we have taken a teacher perspective on differentiated instruction by focusing on the factors that, in general, influence the teacher's implementation of DI in classroom practice (chapter 2); and what happens in the interaction between the (school) context and the teacher (chapter 5), and between the teacher and classroom practice (chapters 3 and 4), as is illustrated in Figure 1.1.

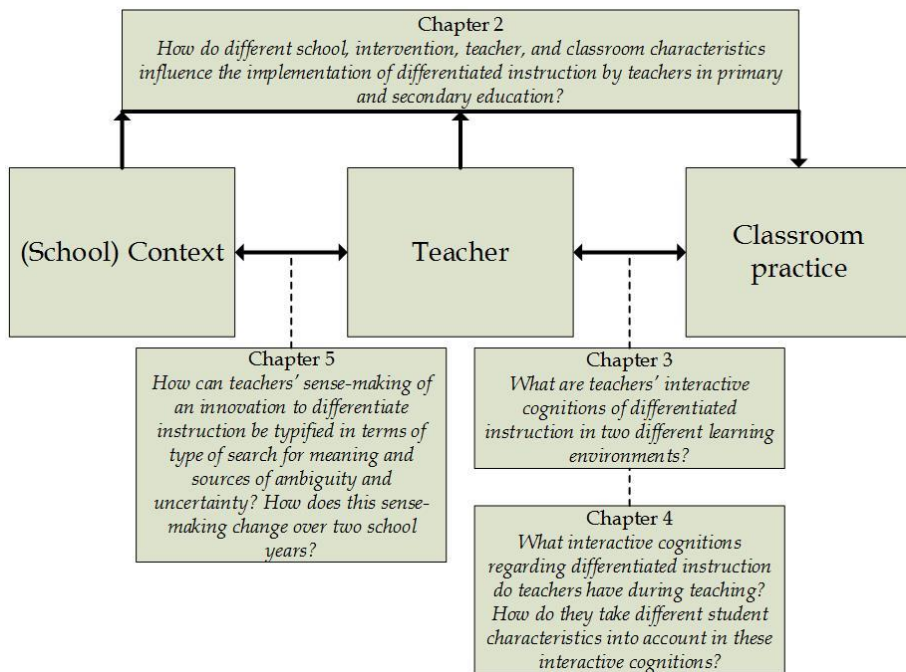


Figure 1.1 Overview of chapters

Chapter 2: The influence of school, intervention, teacher, and classroom characteristics on the successful implementation of differentiated instruction: A review of empirical findings

Since many studies have shown that differentiated instruction is a pedagogical approach that is difficult for teachers to implement, we have conducted a systematic literature review in order to better understand these difficulties. In this chapter we describe that review that aimed to gather an overview of what is known in the literature about what factors influence teachers' implementation of DI and how, by answering the question: *How do different school, intervention, teacher, and classroom characteristics influence the implementation of differentiated instruction by teachers in primary and secondary education?* To select articles to answer this question, we adhered to four inclusion criteria. The article had to be: 1) published in a peer-reviewed journal; 2) about an empirical study; 3) focused on in-service primary and/or secondary teachers, principals, or schools as participants; and 4) aimed at elaborating on factors influencing teachers' practices regarding DI. This selection method provided us with 29 articles. Each article was examined for results and conclusions referring to factors considered to influence the implementation of DI and describing how these factors influenced implementation. These factors were categorized using the supply-use model of student learning outcomes developed by Brühwiler and Blatchford (2011). This approach allowed us to organize all these influencing factors and compose a detailed description of the ways in which they affect the implementation of DI. The elaborated framework can be used in future endeavors to implement DI in (secondary) education.

Chapter 3: Teachers' interactive cognitions of differentiated instruction in regular and talent development lessons

Literature has shown that teachers have ideas about implementing DI, but one of the reasons it is often not implemented is that they feel constrained by the organization of the regular classroom context.

Therefore, in this chapter we investigated the teachers' interactive cognitions of DI in their regular lessons and their GUTS lessons (see section 1.4). The aim of this study was to explore teachers' interactive cognitions during their teaching related to DI and investigate whether these interactive cognitions differed in the two teaching contexts. The research question leading this study was: *What are teachers' interactive cognitions of differentiated instruction in two different learning environments?* In order to answer this question, we used stimulated recall interviews. For these interviews, four teachers were observed during one lesson per context and interviewed 1-2 days afterwards using video clips from the observations. The video clips were selected before the interviews and chosen with the aim of encouraging the teachers to elaborate on their interactive cognitions during different types of teacher-student interactions. The interaction categories were: 1) providing instruction; 2) offering help; 3) giving assignments; 4) calling on a student; and 5) checking up on a student. This method allowed us to investigate whether, in a teaching context like GUTS where teachers had more space to experiment with DI and were stimulated to differentiate their instruction, they had different or even more interactive cognitions of DI.

Chapter 4: Differentiating instruction to stimulate student talent development: A year-long study of teachers' interactive cognitions

In chapter 3 we focused on the differences in teachers' interactive cognitions of DI between their regular and their GUTS lessons. The study described in chapter 4 can be seen as a follow-up that took place in the next school year and with partly the same teachers. To study teachers' interactive cognitions of DI more deeply in this chapter, we decided to follow the teachers during the GUTS lessons and focus on the specific content of their interactive cognitions and how learner-centered they were. The leading questions in this study were: *What interactive cognitions regarding differentiated instruction do teachers have during teaching? How do they take different student characteristics into*

account in these interactive cognitions? These questions were answered using the SRI method, as in the study described in chapter 3. Four teachers each participated in four SRIs, spread out over one school year. During the observation part of the SRI method, an observational scheme was used as a guide. The video clips for the interview part of the SRI method were selected based on the categories of the observational scheme: 1) context/goal setting; 2) student assessment; 3) attention for the individual; 4) instruction and classroom routine; and 5) positive, supportive learning environment. At least one video clip was selected from each category to show the teacher during the interview. Through investigating teachers' interactive cognitions of DI in a context likely to capture them, we aimed to uncover how these cognitions varied between and within teachers.

Chapter 5: Teachers' sense-making processes during two years of an innovation aimed to differentiate instruction

In this chapter we describe a study that focused on teachers' sense-making processes of GUTS. The GUTS lessons, which were separated from the regular curriculum, provided teachers freedom in the specific design of these lessons, as long as they adhered to the four criteria mentioned in 1.4. Therefore, we were interested in finding out how teachers experienced such an innovative context, and addressed the following research questions in this chapter: *How can teachers' sense-making of an innovation to differentiate instruction be typified in terms of type of search for meaning and sources of ambiguity and uncertainty? How does this sense-making change over two school years?* Fifteen teachers filled in a questionnaire during the years 2014-2015 and 2015-2016; using this, we measured their perceptions of differentiated student talent development, their self-reported practices of DI, and their attitudes towards GUTS.

Each teacher's data were typified per school year by the type of search for meaning they went through and the sources of ambiguity and uncertainty they experienced. This provided us with a systematic

view of how the teachers perceived GUTS and how they positioned themselves within GUTS. We then compared this positioning with their personal frames of reference (their perceptions of differentiated student talent development and self-reported practices of DI). The idea was that their personal frames of reference would explain the types of search for meaning and sources of ambiguity they experienced. This would provide a rich description of the complex process of sense-making. We did this for both school years and analyzed whether there were differences between the two school years in the teachers' sense-making processes.

Chapter 2

The influence of school,
intervention, teacher, and
classroom characteristics on the
successful implementation of
differentiated instruction:
A review of empirical findings

