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# Chapter 3

## Teachers' interactive cognitions of differentiated instruction in regular and talent development lessons<sup>1</sup>

### Abstract

In this study, we explored teachers' interactive cognitions of differentiated instruction in the context of their regular lessons and in extracurricular talent development lessons. Stimulated recall interviews were conducted with four secondary school teachers in the Netherlands. We found that teachers' interactive cognitions varied depending on the context. More specifically, it appeared that in the extracurricular talent development lessons teachers focused more on small groups or individual students, than in the regular lessons. Also, it was found that teachers often take student characteristics into account, however, teachers differ in how they do this. The study provides a valuable starting point for professional development trajectories that take differences between teachers into account.

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*Teachers' interactive cognitions of differentiated instruction: An exploration in regular and talent development lessons.*

### 3.1 Introduction

In secondary education in many countries, teachers are usually confronted with classrooms of approximately 25 students who have different learning needs. These differences need to be considered, to maximize each student's learning potential (Tomlinson et al., 2003). Across different countries and different school levels, most teachers perceive differentiated instruction (DI) as an important element of their teaching. However, they also encounter difficulties when implementing it (Bosker & Doolaard, 2009; Janssen, Hulshof, & Van Veen, 2016; Tomlinson, 2005). More specifically, they argue that it is difficult to take every individual student's needs into account in a classroom with so many students. Teachers perceive planning in advance to make individualized lesson plans for every student as taking too much time (Janssen, Westbroek, Doyle, & Van Driel, 2013).

Many researchers have described what teachers' practice of DI looks like (Graham et al., 2008; Roiha, 2014; Roy, Guay, & Valois, 2013). Teachers mostly do not use DI, and if they do, they have a limited set of DI strategies. These studies have typically focused on observation of teaching practices, and looked for sets of strategies that they considered to be exemplary of DI (Deunk, Doolaard, Smale-Jacobse, & Bosker, 2015; Tomlinson et al., 2003). Although in literature proactive DI is mentioned as a hallmark of effective DI, planning for DI is complex for teachers, and classroom reality typically needs immediate responses. Teachers therefore will use reactive DI practices as well (Denessen & Douglas, 2015). By observing teachers, research focuses on the outcomes of those responses, rather than taking the teacher knowledge that is embedded within those actions into account. Previous research has shown that merely investigating behavior does not do justice to the complex, unstable, and context-specific reality of teaching situations (Meijer, 1999). Studies on teachers' interactive cognitions, teachers' knowledge that is embedded in their practice, have provided more insight into that complex reality of teaching

(Meijer, 1999; Verloop, 1989). Therefore, in this study we investigated teachers' interactive cognitions of DI in two different learning environments: the regular classroom environment and an extracurricular environment with a focus on student talent development. Teachers did not have to follow a set curriculum and were encouraged to differentiate their instruction in this extracurricular environment. Therefore, by looking at these two environments we get a comprehensive view of teachers' interactive cognitions of DI and determine whether these cognitions are different depending on the type of environment. The study was guided by the following general research question: *What are teachers' interactive cognitions of differentiated instruction in two different learning environments?*

## **3.2 Theoretical background and conceptual framework**

### *3.2.1 Differentiated instruction*

Differentiated instruction can be defined as "an approach to teaching in which teachers proactively modify curricula, teaching methods, resources, learning activities, and student products to address the diverse needs of individual students and small groups of students to maximize the learning opportunity for each student in a classroom" (Tomlinson et al., 2003, p.121). This definition mostly focuses on academic DI. This means that a teacher, together with his students, capitalizes on the strengths of his/her students, overcoming their weaknesses (Corno, 2008). In addition, a teacher can also focus on incorporating students' cultural backgrounds in the lesson content and equally dividing status across students from different cultural backgrounds, also known as teaching for equity, or cultural DI (Cohen & Lotan, 1995; Severiens, 2014).

In this study, when we mention DI, we focus specifically on teachers' academic DI, since the teachers in the extracurricular classroom environment were encouraged to differentiate their

instruction with regard to students' academic talents. The students' cultural backgrounds, in this definition of DI are part of the students' learning profile, one of the student characteristics teachers take into account when differentiating instruction, and were as such also accounted for in this study (Tomlinson et al., 2003). Focusing on this academic DI, the two main tasks for a teacher are to plan for DI in his/her lessons and to assist (groups of) students in their work on assignments (Smit & Humpert, 2012). During both those tasks, a teacher takes his/her students' individual learning needs into account (Smit & Humpert, 2012; Subban, 2006; Tomlinson et al., 2003). These learning needs can be typified by three student characteristics: (1) student readiness (the level at which students can perform with moderate challenge); (2) student interest (students' interests and motivation); and (3) student learning profile (students' SES, ethnicity, learning preferences, etc.) (Tomlinson et al., 2003). In section 1.2.1 these student characteristics have been described in more detail.

Research studying DI has concluded that, when implemented well, DI can be beneficial to students' motivation, engagement, and achievement (e.g. Deunk et al., 2015; Mastropieri et al., 2006). DI is considered to be implemented well when the teacher, amongst others, makes use of flexible grouping and plans DI proactively (Deunk et al., 2015; Smit & Humpert, 2012; Tomlinson et al., 2003). The necessity of proactive DI does not imply that reactive DI is less important. Events during teaching will occur that require teachers' immediate responses in which they take students' learning needs into account (Denessen & Douglas, 2015).

Since teachers often experience difficulties with the implementation of DI, we value it important to take on a teacher perspective and explore teachers' thinking-in-action during teacher-student interactions. In this study, we focused on teachers' interactive cognitions of DI for small groups or for individual students while (a)

providing instruction, (b) offering help, (c) calling on students, and (d) giving assignments (Tomlinson, Brimijoin, & Narvaez, 2008).

### *3.2.2 Teachers' interactive cognitions*

In literature, teachers' interactive cognitions are considered part of teacher knowledge (Meijer, 1999; Verloop, 1989). Teacher knowledge relates to teachers' actions while teaching, and accounts for the complexity of interactive teaching and thinking-in-action (Munby et al., 2001). The concept of teacher knowledge is based on the idea that there is reciprocity between the whole of teachers' cognitions and insights and their activities in the classroom (Verloop, Van Driel, & Meijer, 2001). What is referred to as interactive cognitions within teacher knowledge, is the knowledge that is active in a teacher's mind during classroom teaching (Verloop, 1989). This type of knowledge is specifically important in the context of using DI strategies. Although teachers should aim to plan their use of these strategies in advance as much as they can, students' individual needs and interests often become apparent during classroom teaching, requiring teachers to recognize them and respond to them on the spot (Denessen & Douglas, 2015; Tomlinson et al., 2003). To investigate these interactive cognitions, stimulated recall interviews (SRIs) are commonly used (Meijer, 1999; Verloop, 1989). In studies of teacher planning, teachers' interactive cognitions have often been investigated using think-out-loud protocols when they are planning their lessons. However, when they are teaching, it is impossible for teachers to think out loud about what they are doing (Meijer, 1999). Therefore, teachers' lessons are recorded on video, and afterwards, teachers are asked to reconstruct their thinking while they were teaching.

### *3.2.3 The current study*

In the current study, we aim to provide a more comprehensive understanding of teachers' interactive cognitions of DI by

investigating it in two different learning environments: (1) regular lessons; and (2) talent development lessons. In the talent development lessons, as mentioned above, teachers were encouraged to differentiate their instruction. In addition, students themselves selected the subjects in which they wanted to follow the talent development lessons, which means there is self-differentiation among the students. More specifically, the students differentiate for themselves in the subject that is to be learned based on their achievement and interest in the subject (Severiens, 2014). As a consequence, the self-differentiation leads to a smaller range of differences between students' readiness and interests in the talent development lessons compared to the regular lessons. Teachers thus have to make relatively smaller adjustments in their teaching to meet students' learning needs (Deunk et al., 2015). In addition to the more homogeneous group of students that results from self-differentiation, the teachers did not have to adhere to the regular curriculum in these lessons. This makes the talent development lessons an opportune context to experiment with DI (De Neve, Devos, & Tuytens, 2015; McTighe & Brown, 2005).

### **3.3 Method**

#### *3.3.1 Context: Talent development lessons*

Data were collected in the bilingual secondary school in the Netherlands that participated in the project GUTS, as was described in 1.4. The current study took place in the first school year GUTS was implemented (2013-2014). This year, the GUTS lessons, with a length of 100 minutes (2 lesson hours), all took place on Wednesday afternoons between November and June. These lessons did not have to relate directly to the regular curriculum, but the content had to be related to the subject matter from the regular lessons. The teachers, thus, had to design new lessons that would be enriching and motivating for all students. To increase the likelihood that all students

experienced the lessons as enriching and motivating, teachers were specifically requested to plan for DI in these lessons.

### 3.3.2 Participants

Eight first-grade teachers (student age 12) of the participating school were asked to participate in this study. The teachers were selected on the basis of their subject clusters: science (e.g., Biology, Mathematics), language (e.g., Dutch language and literature, French), society (e.g., History, Geography), and creative (e.g., Art and Design, Drama). One teacher from each cluster was willing to participate. For the relevant characteristics of the participants, see Table 3.1.

Table 3.1 Characteristics of participants

| Teacher<br>(gender)  | Alex (m)    | Bert (m)                            | Carla (f)       | Debra (f)         |
|----------------------|-------------|-------------------------------------|-----------------|-------------------|
| Subject              | Mathematics | History                             | Art &<br>Design | Dutch<br>language |
| Years'<br>experience | 3           | 20                                  | 6               | 1                 |
| Education            | University  | Higher<br>Professional<br>Education | University      | University        |

### 3.3.3 Procedure

#### Data collection

As mentioned in the theoretical framework of this chapter, SRIs were used to investigate teacher knowledge. All four participating teachers were observed twice while teaching – first during a talent lesson (100 minutes) and second during a regular lesson (50 minutes), chosen together by the first author and the teacher. The observations were video recorded, and this video material was used to help the teachers to relive the lesson and think out loud about what they were thinking during a certain teacher-student interaction and why they were



undertaking it. This served to elicit the teachers' considerations behind their interactions with students, which could provide insight into their interactive cognitions (Meijer, 1999; Nguyen, McFadden, Tangen, & Beutel, 2013).

In many studies in which SRIs were used, teachers were shown video recordings of complete lessons, and the teachers themselves paused the video when they were aware of having had a certain thought during an activity (Meijer, 1999; Verloop, 1989). As we were only interested in teachers' interactive cognitions of DI, we decided to show the teachers only those teacher-student interactions in which we expected they were considering students' characteristics (Nguyen et al., 2013). This meant that the PhD candidate, who conducted the SRIs, selected clips from each videotaped lesson to discuss with the teachers.

*Table 3.2 Teacher- student categories for the SRI and descriptions of these interactions*

| <b>Teacher-student interaction</b> | <b>Description</b>                                                                                   |
|------------------------------------|------------------------------------------------------------------------------------------------------|
| Providing instruction              | Teacher provides instruction in what is going to happen during the lesson and/or the subject matter. |
| Offering help to a student         | Teacher helps students with the problems or difficulties they encounter                              |
| Giving assignments                 | Teacher gives students assignments to work on during and/or after the lesson.                        |
| Calling on a student               | Teacher picks out a student to answer a question/ask a question.                                     |

Each of the clips showed a teacher-student interaction in one of the following categories: (1) providing instruction; (2) offering help; (3) giving assignments; and (4) calling on a student. The categories are explained in Table 3.2. We were specifically interested in teachers' interactive cognitions during teacher-student interactions in the above-mentioned categories, since these are common in teachers' practice and

likely to show up in both types of lessons. When watching the video clips afterwards, it appeared that most teacher-student interactions fell into one of these four categories – which are explained in Table 3.2. In selecting the clips, we made sure that each category of teacher-student interactions was discussed at least once in the SRIs. This would make comparison of both environments and of the different teachers more feasible. Thus, four clips containing the four teacher-student interactions were chosen to show the teachers. Further selection criteria for the video clips were quality (audibility and visibility) and best fit within the category. After each video clip, the teachers were asked what they were thinking during that particular interaction, and what made them act in that way. The interviews were all recorded on an audio recorder and afterwards transcribed verbatim.

### Data coding

The first step in coding the SRIs was coding the interactions that were discussed in the interviews. In the transcripts of the interviews, the teacher-student interactions were retraced and coded with the names of the categories in which they fell. In all interviews, talking about a certain interaction triggered the teachers to also explain something about other interactions that occurred during the lesson. These interactions were also coded. It appeared that not all of these interactions fell into the categories that were made up in advance. Therefore, a new category was added and named ‘checking up on a student’, now covering all teacher-student interactions in the collected data. The interactions that fell into this category were those where the teacher was walking around the classroom, looking at or asking about what and how the students were doing.

After the coding of the teaching behavior, teachers’ interactive cognitions were coded. A teacher’s reasoning behind an observed interaction was considered an interactive cognition. If the teacher’s interactive cognition showed that the teacher considered a student’s needs, a code with a student characteristic (readiness, interest, and/or

learning profile) as described by Tomlinson et al. (2003) was added to the teacher-student interaction code. Table 3.3 shows the student characteristic codes with their descriptions.

Table 3.3 Codes of teachers' interactive cognitions of student characteristics, and their descriptions

| Student characteristic | Description                                                                                                                                                                                                                                                             |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Readiness              | Teacher considers student readiness when (s)he makes sure that his/her support, feedback, and tasks are at the right difficulty level for the individual student.                                                                                                       |
| Interest               | Teacher considers modifying instruction to take account of interest and/or to enhance individual students' (or small groups of students') motivation, productivity, and achievement.                                                                                    |
| Learning profile       | Teacher considers adjusting instruction to the student's learning profile, referring to the student's preferred mode of learning, environment, emotions, interactions, physical needs, intelligence preference (analytical, practical, creative), gender, culture, etc. |

An example of a teacher's interactive cognition with student characteristics is this quote from Carla (Art & Design): "[I explained it verbally, because] I want them to think for themselves, to form their own image... I know, if I give them examples, they will copy them, they will do exactly the same thing" (interaction category: offering help; student characteristic: readiness). We coded *readiness* for this quote, since the teacher argues that she wants the students to move forward from what they already can and do.

An example of a teacher's interactive cognition without knowledge of differentiated instruction is Alex (Mathematics), who explains the following after being asked about his reasons for telling

the students what is going to happen during the lesson: “I don’t do this every lesson. I mean, a routine is pretty well established, start the same way, do the same things, finish the same way. So, one day I do something a little bit different [and I tell them], like today. But when it is just a normal lesson [not], it’s what you can expect” (interaction category: providing instruction; student characteristic: none). For this quote, no student characteristics were coded, as the teacher did not seem to take the students’ needs into account when choosing this way of starting the lesson.

### Data analysis

After coding all cases, we conducted cross-case and within-case analyses. For the cross-case analysis, the numbers of the interactive cognition codes per teacher-student interaction were compared across lesson types and across lesson types per teacher. Reliability was aimed at by using a member-check (Miles & Huberman, 1994); the teachers were asked by email whether they recognized themselves in the analyses and, if not, to comment on the data. To answer this question, they were provided with the lesson descriptions and quotes used in the current paper. In addition, one of the supervisors coded 75% of the interviews (6 interviews), and this was compared with the coding of the PhD candidate. Cohen’s kappa was calculated at 0.66, which can be considered sufficient. However, to further assure the quality of the coding process, the PhD candidate together with the supervisor discussed the coding scheme and process, and adapted it where we found this to be necessary.

The quantitative analyses were supplemented by qualitative analyses. For this, a summary of every lesson was made for each teacher. In these summaries, we focused on results complementing the quantitative results. It should, therefore, be noted that although the summaries are a good illustration of each lesson, more activities were undertaken by the teachers than are described.

### 3.4 Results

This section reports quantitative and qualitative comparisons of teachers' interactive cognitions during regular and GUTS lessons to answer the research question: *What are teachers' interactive cognitions of differentiated instruction in two different learning environments?*

Table 3.4 shows the frequencies of each teacher activity discussed during the SRIs. It also provides the frequencies of the student characteristic codes readiness (R), interest (I), and learning profile (LP), reflecting the teacher knowledge evident in those teacher activities.

In some instances, more than one student characteristic was coded in a teacher-student interaction. Therefore, the sum of all frequencies of the student characteristic codes can outnumber the frequencies of the teacher-student interactions. For example, in the two rightmost columns in Table 3.4, *calling on a student* was coded five times (GUTS), the student characteristic *readiness* twice, *interest* once, and *learning profile* once; and on two occasions *no* student characteristic codes were linked to a teacher activity.

The results presented in Table 3.4 show that the frequencies of almost all teacher-student interactions for all teachers were equal for both types of lessons. Only two teachers had one or two interactions which varied depending on the learning environment. For Bert, *checking on a student* occurred more often during his GUTS lesson (7) than in his regular lesson (1). Debra had substantial differences between her GUTS and regular lessons for *calling on a student* (GUTS=1; regular=6) and for *providing instruction* (GUTS=0; regular=3).

Table 3.4 Frequencies of codes of teachers' interactive cognitions of student characteristics, related to teacher-student interactions per teacher

| Teacher-student interaction | Student characteristic   | Alex                        |                   | Bert           |                   | Carla          |                   | Debra         |                   | Total |         |
|-----------------------------|--------------------------|-----------------------------|-------------------|----------------|-------------------|----------------|-------------------|---------------|-------------------|-------|---------|
|                             |                          | GUTS<br>(n=18) <sup>c</sup> | Regular<br>(n=20) | GUTS<br>(n=17) | Regular<br>(n=22) | GUTS<br>(n=20) | Regular<br>(n=22) | GUTS<br>(n=3) | Regular<br>(n=20) | GUTS  | Regular |
| Calling on a student        |                          | 1                           | 3                 | 2              | 3                 | 1              | 1                 | 1             | 6                 | 5     | 13      |
|                             | <i>R</i> <sup>a</sup>    | 1                           | 1                 | 0              | 2                 | 1              | 1                 | 0             | 5                 | 2     | 9       |
|                             | <i>I</i> <sup>b</sup>    | 1                           | 1                 | 0              | 0                 | 0              | 0                 | 0             | 0                 | 1     | 1       |
|                             | <i>LP</i> <sup>c</sup>   | 0                           | 1                 | 0              | 1                 | 0              | 1                 | 1             | 1                 | 1     | 4       |
|                             | <i>none</i> <sup>d</sup> | 0                           | 1                 | 2              | 0                 | 0              | 0                 | 0             | 1                 | 2     | 2       |
| Checking on a student       |                          | 1                           | 1                 | 7              | 1                 | 1              | 1                 | 2             | 2                 | 11    | 5       |
|                             | <i>R</i>                 | 1                           | 0                 | 6              | 1                 | 1              | 0                 | 1             | 1                 | 9     | 2       |
|                             | <i>I</i>                 | 0                           | 1                 | 3              | 0                 | 0              | 0                 | 1             | 0                 | 4     | 1       |
|                             | <i>LP</i>                | 0                           | 0                 | 1              | 0                 | 1              | 0                 | 0             | 0                 | 2     | 0       |
|                             | <i>none</i>              | 0                           | 0                 | 0              | 0                 | 0              | 1                 | 0             | 1                 | 0     | 2       |
| Giving assignments          |                          | 0                           | 0                 | 0              | 1                 | 0              | 2                 | 2             | 1                 | 2     | 4       |
|                             | <i>R</i>                 | 0                           | 0                 | 0              | 0                 | 0              | 2                 | 0             | 1                 | 0     | 3       |
|                             | <i>I</i>                 | 0                           | 0                 | 0              | 0                 | 0              | 0                 | 0             | 0                 | 0     | 0       |
|                             | <i>LP</i>                | 0                           | 0                 | 0              | 1                 | 0              | 0                 | 0             | 0                 | 0     | 1       |
|                             | <i>none</i>              | 0                           | 0                 | 0              | 0                 | 0              | 0                 | 2             | 0                 | 2     | 0       |
| Offering help               |                          | 3                           | 1                 | 1              | 2                 | 4              | 3                 | 1             | 2                 | 9     | 8       |
|                             | <i>R</i>                 | 2                           | 1                 | 1              | 1                 | 3              | 3                 | 0             | 1                 | 6     | 6       |
|                             | <i>I</i>                 | 0                           | 0                 | 0              | 0                 | 1              | 0                 | 0             | 0                 | 1     | 0       |
|                             | <i>LP</i>                | 0                           | 0                 | 0              | 1                 | 0              | 0                 | 0             | 1                 | 0     | 2       |
|                             | <i>none</i>              | 1                           | 0                 | 0              | 0                 | 0              | 0                 | 1             | 0                 | 2     | 0       |
| Providing instruction       |                          | 1                           | 3                 | 1              | 2                 | 1              | 1                 | 0             | 3                 | 3     | 9       |
|                             | <i>R</i>                 | 0                           | 0                 | 0              | 0                 | 1              | 1                 | 0             | 1                 | 1     | 2       |
|                             | <i>I</i>                 | 1                           | 0                 | 1              | 1                 | 1              | 1                 | 0             | 0                 | 3     | 2       |
|                             | <i>LP</i>                | 0                           | 0                 | 0              | 1                 | 0              | 0                 | 0             | 0                 | 0     | 1       |
|                             | <i>none</i>              | 0                           | 3                 | 0              | 0                 | 0              | 0                 | 0             | 2                 | 0     | 5       |
| All                         |                          | 6                           | 8                 | 11             | 9                 | 7              | 8                 | 6             | 14                | 30    | 39      |
|                             | <i>R</i>                 | 4                           | 2                 | 7              | 4                 | 6              | 6                 | 1             | 9                 | 18    | 24      |
|                             | <i>I</i>                 | 2                           | 2                 | 4              | 1                 | 2              | 1                 | 1             | 0                 | 9     | 4       |
|                             | <i>LP</i>                | 0                           | 1                 | 1              | 4                 | 1              | 1                 | 1             | 2                 | 3     | 8       |
|                             | <i>none</i>              | 1                           | 4                 | 2              | 0                 | 0              | 1                 | 3             | 4                 | 6     | 9       |

<sup>a</sup>R = Readiness; <sup>b</sup>I = Interest; <sup>c</sup>LP = Learning Profile; <sup>d</sup>none = no student characteristic

To provide a more comprehensive view of the above findings, the qualitative results are presented next. For each individual teacher, we discuss their most prominent result from Table 3.4 and we relate this to their lessons. All lessons that were discussed in the SRIs are summarized, and some quotes from the teachers that highlight how they spoke about student characteristics are used in these summaries in order to make the teachers' interactive cognitions as concrete as possible.

### *3.4.1 Carla (Art & Design, 6 yrs. experience)*

Table 3.4 shows that Carla's GUTS and regular lessons were more or less the same with regard to the teacher-student interactions and her interactive cognitions of student characteristics.

Carla's GUTS lesson started with brief instructions given to the students by her colleague. After this, the students got to work on their paintings. All students were given the same assignment for their painting: to copy a painting by Vincent van Gogh. The students got to choose themselves which painting to copy (student interest). Sometimes Carla walked up to students who made it clear they needed her help; as Carla explained in the SRI, she would then help them in a way she thought was most suitable for that particular student (student readiness). She also told in the interview that even if students did not have a particular question, she would still stop by them, since she knew that some of the students would have more trouble working than others (student readiness). For example:

Interviewer: "I saw you doing something with him which I didn't see you do with other students. I mean, there are times you take the paint brush out of the student's hand, (...) and then you take over. But with him, you take over and then he paints himself, but you stay with him."

Carla: “Because (...) I know that some know exactly what they are doing, what they have to do. (...) [but] I know that he will return to me after five minutes, so it’s better if I stay with him for a while, because I know he is like that, that he says ‘I don’t know any more what I have to do, what do I do (...)’ (...) or asks others what they are supposed to do, and then I’d rather stay with him.” (student readiness)

During Carla’s regular lesson, she provided the instructions at the beginning of the lesson herself, as only one teacher is present. After the instructions, in which all students were given the same assignment, the students got to work on their individual projects; they got to choose themselves what picture they would do (student interest). The teacher explained in the SRI that although all students had the same assignment she would allow a student with difficulties to do an easier version of the assignment (student readiness). The reason she chose a challenging version was that she thought this class needed the challenge to stay motivated:

“Yes, because this class is very talkative, they’re really sharp, and well, I thought, (...) show me what you can do. (...) and they say, ‘yes miss, this is really easy’ (...) Well, then bring it (...) and in the end it is great to see that when you give them an extra challenge, that they can do it that they also get that feeling ‘oh, okay, yeah I really can do it’.” (student interest and readiness)

In the interview she also clarified that when students needed help, she would give it, like in the GUTS lesson, as she saw fit for the particular student she was helping (student readiness). However, simply walking to a student to see how (s)he was doing was something she did less frequently. In the SRI she made it clear that not all students would find it fair if some students got more help than others when the



assignment was for a grade. Nevertheless, as stated above, Carla tried to help individual students as much as possible in both types of lessons, when she thought it was needed.

### 3.4.2 Debra (Dutch language, 1 yr. experience)

Debra's results in Table 3.4 show two prominent differences: (1) *calling on a student* (GUTS=6; regular=1), and (2) *providing instruction* (GUTS=3; regular=0). This contrasts the frequencies for *checking on a student* (GUTS=2; regular=2) and *offering help* (GUTS=1; regular=2). In her GUTS lesson, there were two teachers for only three students. Therefore, more presence of *checking on a student* and *offering help* could have been expected in the GUTS lessons. Debra's explanation is illustrated below.

Debra gave the GUTS lessons together with a colleague, who started the whole class instruction for the three students. The students were given instructions for the assignment central to the lesson at hand. All students were given the same assignment, one working alone and two together, but they were provided with a minimum set of rules: the students could choose their own subject and their own way of completing the assignment. Debra especially focused on the two girls working together, by looking from time to time at how they were doing. In the SRI she explained that she let them work as much as possible on their own and only helped the girls when they asked for help:

"Yes, a teacher constantly watching you, you know, they also should have the opportunity to do their own thing and discuss stuff with each other, without me watching. Alone, they can give each other feedback, while if I sit there, they can't really speak freely." (student interest)

During Debra's regular lesson, she instructed the students classically in a new subject and then let them work on assignments from the

textbook. When Debra saw, as she said in the interview, that (almost) all students had completed one or two assignments, she would project the answers on the whiteboard to let them check their answers. An example of her approach:

“Sometimes I do it step-by-step; orthography is always convenient to project and this projecting always goes pretty fast. And because it is not a very difficult assignment, (...), they can do it themselves. But that first one I wanted to [discuss with them] as an example, because it is a completely new topic. But I thought, the rest they will see for themselves.” (student readiness)

A few answers were discussed during whole-class discussion. Debra explained that sometimes she let random students give the answer, and other times she called on students who were not paying attention in spite of needing the instruction (student readiness).

#### 3.4.3 Bert (History, 20 yrs. experience)

Bert's results in Table 3.4 show a big difference in the frequencies of *checking on a student* (GUTS=7; regular=1), and when doing this, he always considered student characteristics during the GUTS lesson. His interactive cognitions mostly focused on students' *readiness* (6). Bert's regular lesson was mainly whole-class instruction; while in the GUTS lesson small group-work was central with Bert regularly checking on them.

Bert's GUTS lesson started with a short recapitulation of the previous two GUTS lessons. Next, the students worked independently in groups of three or four who all had the same assignment, but they could decide on their own topic (student interest). During his walk around the classroom, Bert discovered that the students had trouble finding the right information. So he gave them in a short whole-class moment more detailed instructions:

“But as I started to notice that it would be a long process, I thought I should give them more simple sources. I found History for Kids and while it was intended that they would read primary sources, this appeared to be too difficult. So I also let them read secondary sources, (...), and that did work, but it was too difficult anyway for some groups.” (student readiness)

The students continued to work in their groups, and Bert walked by the groups. He would help some groups more than others or in different ways. For example, he told one group exactly the same as he had first said in English, only then in Dutch, as Bert felt that the cause of their problem might have been the language barrier rather than the difficulty of the task at hand (student readiness and learning profile).

Almost all of Bert’s regular lesson was whole-group instruction in the subject matter. Bert told a story about an important historical battle and certain impacts this had. He used this type of instruction because he feels most comfortable with it, he explained in the interview. Also, he said that some students have told him throughout the years that they find his lessons very interesting (student interest). The whole-class instruction started with a recapitulation of the previous lesson, and he let this flow into the subject matter of the current lesson. During his instruction, he sometimes asked students questions; Bert explained in the SRI that these questions were useful for checking whether they already knew anything about the subject, or for getting them to think about certain concepts (student readiness). When a student did not know the answer, he would adjust his response:

Interviewer: (video) “So you ask, who lives in the south, then you point at someone. You don’t really get an answer, so you repeat the question [and let someone else answer]. Could you explain why you do it like that?”

Bert: “No, I do a lot of things, I just do something that seems suitable and then, yeah, because I think if someone like me clearly sees, that first student doesn’t know the answer. Yes, then I think I’m embarrassing her.” (student readiness)

Towards the end of the lesson Bert gave the students an assignment. One student did not understand the assignment and the teacher used the same strategy as he used in his talent lesson: he explained the assignment in Dutch (student learning profile).

#### 3.4.4 Alex (*Mathematics, 3 yrs. experience*)

The most salient result in Table 3.4 for Alex occurred when *providing instruction* (GUTS=1; regular=3) while considering students’ *interest* during the GUTS lesson, but not during the regular lesson. Out of all student characteristics, it is apparent that during the GUTS lesson, he mostly used knowledge of the students’ *readiness* (4). However, the ways he answered students’ questions in the two lessons give a different view. In his GUTS lesson, he adjusted his (way of) answering to small groups and individual students. During his regular lesson, he mostly aimed to adjust his way of answering to the level of the whole class. Thus, while focusing in both lessons on student *readiness*, in his GUTS lesson, he was more focused on small groups and individual students, and in his regular lesson he focused on the whole class.

Alex’s GUTS lesson was set up around a certain assignment the students had to complete. The teacher started the lesson with a short movie on the subject in order to get the class’s attention and then provided whole-class instruction in what they were about to do, in order to get them to think about what was expected of them. He thought students would like this approach more than simply telling them to be quiet and immediately listen to him explaining what they were about to do (student interest). Next, he asked them to set up and

work in groups of four while he sat at his desk, available for student questions:

“What I want them to do is have as much independence as possible. And so I want to give them the space to figure things out, work together. If I’m constantly hovering there, telling them what they have to do, (...) they are just waiting for me to answer their question.” (student readiness)

When the students had questions, they would come up to his desk with them. How he answered a question depended partly on the student. During the SRI he made clear that if he expected that the student should know the answer, or at least part of it, he would ask the student questions back in order to let him answer his own question. He would also adjust his explanation or answer when he expected a student to have difficulty understanding it (student readiness).

During Alex’s regular lesson, he discussed a test the students took the previous week. He started with the distribution of the graded tests, during which he informed the students about their results. He explained in the SRI that his evaluation of the results did not depend on the grade alone, but also on his expectation of what grade the individual student should be able to get (student readiness). He discussed the test during whole-class instruction by letting students nominate questions from the test they would like to have explained. Every question was answered stepwise during this whole-class instruction; with each step, the students had a chance to answer these steps in order to get to the final answer. The teacher sometimes let the student answer who asked the question initially, and sometimes asked a different, randomly chosen student:

“Well, so I just call random students, it keeps them paying attention, keeps them involved, cause they might have an answer, or they might... especially in this class, it’s a very quiet

class, they have a question, but they're not going to put a hand up, so I just call them." (student interest and learning profile)

Checking the test took most of the lesson. At the end, the students worked on their homework.

### *3.4.5 Final remarks*

These qualitative results show four very different teachers with respect to teaching different types of lessons and having different interactive cognitions. We believe these results give more depth to the quantitative results shown in Table 3.4. For example, the regular lessons Alex and Bert taught were whole-class-oriented lessons; therefore, the student characteristic codes resulting from these lessons should be interpreted differently as they were focused on larger groups of students or the whole class most of the time, rather than on individual students. For Alex this is partly true for the GUTS lesson, too: the interactive cognitions regarding student characteristics he used did not always reflect characteristics of individual students or small groups of students. In addition, for Carla, there were no clear differences in the tables between the two types of lessons, nor did the description show many differences. The biggest difference is in the way she helped students and checked on them. She said she could do this more freely during her GUTS lesson; in the regular lesson, students might not think it fair if she attended to some students more than others. Debra included student characteristics more during her regular lesson than during her GUTS lesson, but her GUTS lesson was a very different lesson for her, as she said in the interview, because there were two teachers present for only three students, and she focused mostly on two girls working together. This could have provided more considerations of student characteristics (because it might have been easier to take account of their needs), but it made her uncomfortable, causing her not to interact much with them.

### **3.5 Conclusion and discussion**

#### *3.5.1 Teachers' interactive cognitions*

In this study teachers' interactive cognitions of DI were explored in two different contexts (regular and GUTS lessons). More specifically, we focused on teachers' interactive cognitions of student characteristics. We found that teachers' interactive cognitions were focused on at least one student characteristic in their decision of how to approach the group of students or an individual student during teacher-student interactions. We were thus able to determine that teachers are learner-centered in their provision of instruction, a typical characteristic of DI (Tomlinson et al., 2003).

In addition, the focus on interactive cognitions adds to previous studies in which was concluded that teachers have knowledge of DI, but have trouble implementing it. This study shows how teachers consider differences in student characteristics teachers use to inform their decisions about instructional strategies (Bosker & Doolaard, 2009; Meijer, 1999; Tomlinson, 2005).

#### *3.5.2 Differences between learning environments*

The focus of this study was to explore the differences in teachers' interactive cognitions across the two different learning environments. During the SRIs, it appeared that teachers' interactive cognitions of student characteristics during the regular lessons did not differ much from the interactive cognitions during the GUTS lessons (Table 3.4). A difference that could be found, concerned the focus of the student characteristics: during the regular lessons the teachers apparently mostly considered the whole class, while in the GUTS environment, small group or individual student characteristics were more at the center of the teachers' interactive cognitions. This underscores the aforementioned idea of the GUTS lessons providing an environment in which DI is possibly easier to achieve for teachers, as the group of students in this environment is less heterogeneous in motivation for

and achievement in the subject (Deunk et al., 2015; Tomlinson et al., 2003; Tomlinson et al., 2008). In more homogeneous classrooms it is easier for the teacher to get an overview of the different learning needs and (s)he only needs to make minor adjustments to his/her teaching (Deunk et al., 2015). In addition, another explanation might be the relatively high level of autonomy for teachers in designing their GUTS lessons (De Neve et al., 2015). However, providing autonomy only helps when teachers feel efficacious to differentiate their instruction. In the findings, we noticed for example that for Debra, who felt quite uncertain in an environment with little structure and a small group of students, her interactive cognitions showed many similarities in both contexts.

Overall, we argue that apparently teachers do know more about DI than is often observed in their practices and that a different learning environment can help teachers in practicing this knowledge.

### *3.5.3 Implications, limitations and future directions*

We explored teachers' interactive cognitions of DI in two different in-school learning environments (regular and GUTS) with SRIs in this study. As there was no set curriculum for the GUTS lessons and the student groups were more homogeneous, we thought it might be easier for teachers to differentiate in those lessons (De Neve et al., 2015; Tomlinson et al., 2003; Tomlinson et al., 2008). The results indeed pointed in that direction: teachers had more interactive cognitions with individual student characteristics in the GUTS lessons, whereas they used more whole class-characteristics in their regular lessons.

In this study, we focused on the student characteristics that teachers take into account during certain types of teacher-student interactions. We hereby did not attempt to identify whether the teachers' reactive DI was more focused on process, content or product (Tomlinson et al., 2003). However, we recognize that it is possible that since we focused specifically and intentionally on teachers' reactive



(and unplanned) DI, DI in the process of instruction was more present in this study, rather than the content and product since they appear to be more planned by teachers (Tomlinson et al., 2003).

Although differences in teachers' interactive cognitions might have been expected, based on the personal nature of these cognitions (Meijer, 1999; Verloop et al., 2001), these differences could imply that teachers' readiness for differentiating instruction varied (Smit & Humpert, 2012). In the introduction of this chapter, we argued that to increase student achievement, it is important to teach students through their zones of proximal development (Tomlinson et al., 2003). In a future study, therefore, it would be useful to look at each teacher's starting point and at the education and training he has received in differentiated instruction. Also, an understanding of teachers' beliefs is important (Meijer, 1999; Munby et al., 2001; Verloop et al., 2001). Beliefs are described in many studies as intertwined with and hard to distinguish from knowledge (Pajares, 1992). This is because beliefs are strong convictions, and the forming and change of these convictions is related to knowledge. Both knowledge and beliefs are important when teacher change – e.g. towards more DI – is desirable (De Neve et al., 2015; Van Veen, Zwart, Meirink, & Verloop, 2010). Using this information on previous experiences and beliefs, the teachers' ZPDs could be mapped. In future professional development initiatives in the context of DI, we argue that teachers' individual needs should be taken into account as much as possible.

## **Chapter 4**

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

