Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

Abstract To effectively educate high-ability students, teachers must possess accurate beliefs, knowledge, and skills related to teaching these students. Previous research indicates that teachers in regular classrooms may have misconceptions about high-ability students and sometimes lack the necessary knowledge or skills for instructing them. The aim of this study is to examine how teachers' beliefs and teaching practices concerning high-ability students evolve through their participation in Research Lesson Study. Thirteen teachers from six mixed-ability elementary and secondary schools were involved in repeated in-depth interviews to explore their experiences. Teachers reported learning gains in terms of refining their frame of reference and enhancing their educational practices. These gains aligned with established evidence-based findings on teaching high-ability students. Moreover, it was observed that teachers with limited knowledge, and teaching skills in their initial profile tend to exhibit lower levels of learning compared to the other teachers. For both in-service teachers and those in training, it appears crucial to foster an accurate and comprehensive frame of reference regarding high-ability students to provide an appropriate education. In this study, professional development for teachers through Research Lesson Study was found to be effective to optimize beliefs about high-ability students and facilitate the development of relevant educational practices.

Keywords high-ability students, educational practices, mixed-ability classroom, Research Lesson Study, teacher professional development, misconceptions

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

1 Introduction

Mixed-ability classrooms are often diverse, and complex based on student differences, i.e., interest, cultural background, ability, and the quality of student learning. In elementary and secondary education, there is a trend toward improving and adapting the learning environment as much as possible to students' individual needs (Dare & Nowicki, 2020). This process entails important challenges in providing an appropriate education for high-ability (HA) students (Scager et al., 2014). HA students are those who excel in a certain domain, considering environmental and personal factors (Gagné, 2004). Since the intellectual or cognitive domain is considered important in education, we focus this study on giftedness in the cognitive domain (Gagné, 2004; Heller et al., 2000; Renzulli, 2005; Siegle & McCoach, 2005; Subotnik et al., 2011). Although there is an ongoing debate about which terms are appropriate to use (Dai & Chen, 2013), this study follows recent research using the term 'HA students' (Bakx et al., 2017; Dare et al., 2019; Lavrijsen & Verschueren, 2020b; Ramos et al., 2021) to refer to students who have the cognitive ability to achieve the highest levels of academic achievement in school (Dare et al., 2019). Although cognitive ability can be considered a continuous spectrum, some researchers also make more categorical distinctions between groups of students based on intelligence (Boncquet et al., 2023). In academic literature, it is common to use cut-off scores to identify students with high cognitive abilities. However, there is no consensus in the literature on the cut off in terms of intelligence scores; these vary between the top 20% and top 1% (Gagné, 2004; Renzulli, 2005; Terman, 1925). In this study, we will use the term 'HA students' for the top 10% of students in class, meaning those with an estimated IQ of 120 or more (Gagné, 2004).

To teach HA students effectively, teachers need to have accurate beliefs, knowledge, and skills about (teaching) HA students. Previous research suggests that teachers in regular classrooms sometimes have misconceptions about HA students (Baudson & Preckel, 2016; Weyns et al., 2021). In addition, teachers sometimes lack knowledge or skills regarding teaching HA students (Barbier, Struyf, & Donche, 2022) . These limited beliefs and skills regarding teaching HA students can have negative consequences for HA students, as they might miss appropriate education. Therefore, teacher professional development can be an important lever for teachers to gain more insight in HA students and their needs and to adopt effective educational practices that are applicable in their classrooms. Teacher collaboration through Research Lesson Study (RLS) is advocated to be a powerful learning tool to influence and change teachers' perceptions and educational practice (Lewis et al., 2013; Vermunt et al., 2023). Up until now, the impact of RLS has never been studied in the Flemish educational context (Seleznyov, 2019; Willems & Van den Bossche, 2019). Moreover, little research has been done on the impact of teacher' professional

development courses regarding teaching HA students. This study contributes to this knowledge gap by studying the impact of RLS as a collaborative teacher professional development method to optimize teachers' current beliefs and educational practices for HA students in Flanders, Belgium.

2 Theoretical framework

2.1 Teaching high-ability students: teachers' beliefs about high-ability students and related educational practices

Education plays an essential role in creating a stimulating and motivating environment. Schools can facilitate HA students' transformation or development of abilities into academic performance (Siegle & McCoach, 2005). Based on previous literature, we can assert that HA students need a challenging learning environment, for instance by accelerating and enriching the learning content (Scager et al., 2014). This academic challenge is necessary to prevent motivational, emotional, and social problems (Lavrijsen et al., 2021; Robinson, 2002). Former systematic review studies indicated various educational practices that are effective in a mixed-ability classrooms including: enhancing self-regulated learning, differentiated instruction, adjusting the curriculum, or giving dynamic feedback (Barbier, Struyf, Verschueren, et al., 2022); García-Martínez et al., 2021; Ziernwald et al., 2022).

Teachers rely on their personal beliefs regarding HA students to select appropriate educational practices (Brighton, 2003). Teachers' often-interrelated beliefs about HA students can be called their 'frame of reference' on HA students, e.g. teachers believing that HA students 'think fast' or 'lack study skills'. As teachers' beliefs and educational practices are interrelated, it is essential to investigate both areas to better comprehend why and how teachers instruct HA students in their classrooms (Fives & Buehl, 2008; Flores, 2001; Pajares, 1992). From previous research, we know both aspects can entail challenges. On the one hand, teachers need a correct and nuanced understanding of students with high cognitive abilities to aid and stimulate their cognitive talent. Teachers can have misconceptions and attribute characteristics to HA students that are not always accurate (e.g., 'HA students are bored in class') (Baudson & Preckel, 2013, 2016; Preckel et al., 2015; Weyns et al., 2021). These misconceptions can hinder teachers in identifying HA students and creating a stimulating and challenging classroom environment. Furthermore, if teachers' evaluations of their students depend too much on the academic achievement of students rather than on their cognitive ability, underperforming HA students will go unnoticed (Lavrijsen & Verschueren, 2020a). Underperforming HA students, or underachievers, are students who show a serious discrepancy between expected achievement and actual achievement (Reis & McCoach, 2000). On the other hand, teachers need

knowledge and skills to provide appropriate education within their classrooms. Despite the availability of clear evidence-based effective educational practices, teachers sometimes lack knowledge and skills to fulfill the educational needs of HA students and provide appropriate education within their classroom (Barbier, Struyf, & Donche, 2022; Brevik, et al., 2018).

A limited or naive frame of reference about HA students and limited knowledge and skills regarding effective educational practices for HA students can hinder teachers from creating a stimulating and challenging classroom environment for HA students (Barbier, Struyf, & Donche, 2022; Scager et al., 2017). It is possible that teachers' beliefs and educational practices are not aligned because of personal and contextual influences (Meirink et al., 2009). To better understand the possible discrepancies between thoughts and actions and seek ways to improve educational practice for HA students, professional development methods aimed to engage teachers to research their own educational practice in collaboration with others during a longer period, which forms the core of a RLS, might be an important asset.

2.2 Research Lesson Study as a vehicle to change teachers' beliefs and classroom practice

RLS is an interesting professional development method for improving classroom practices and changing teacher beliefs. RLS is a classroom-based method for teacher professional learning (Lewis, 2009; Lewis et al., 2019). Teachers of a RLS group formulate a research question concerning how their curriculum or teaching practices can be improved and how that can contribute to the learning of their students and their own professional knowledge. The research question guides the activities in the different phases of a RLS cycle. Lewis et al. (2019) identify four recurring phases: study, plan, teach and reflect. Teachers jointly plan research lessons in which they develop an educational practice and closely study the effects of this new approach through observation and interviews with students. In Europe, most researchers and practitioners use the RLS practice of Dudley (2019). In this form of RLS, teachers purposively select three case students to analyze students' learning in-depth. One RLS consists of three cycles (study, plan, teach, reflect). In each cycle teachers observe and interview the three case students. There has been a fair amount of research on RLS as an effective professional development method. Some relevant literature reviews bring together insights from previous research and point to positive results, both in changing teachers' beliefs (e.g., their frame of reference) and their educational practices (Seleznyov, 2019; Willems & Van den Bossche, 2019; Xu & Pedder, 2015). For example, research has shown that RLS contributes to teachers' beliefs, subject knowledge, skills, and teaching styles (Aas et al., 2023; Lawrence & Chong, 2010; Vermunt et al., 2023). The longitudinal study of Vermunt et al. (2019) revealed that meaning-oriented teacher learning increased

when participating in a RLS. In meaning-oriented learning, teachers do not only learn about what works in their classrooms, but they also try to figure out why and how things work. It is a high-quality, deep mode of teacher learning that can lead to changes in both teachers' beliefs and practice. In addition, research shows that RLS makes teachers more sensitive to and focused on students' educational needs, which leads to greater learning gains for students (Ylonen & Norwich, 2013). Furthermore, Lewis et al. (2019) distinguish four aspects that are relevant when studying the impact of RLS: impact: teachers' (pedagogical) knowledge, impact on teachers' beliefs (e.g., expectations of students), impact on routines and norms of professional learning (e.g., effective collegial learning) and impact on instructional tools and routines (e.g., including formative assessment or informal observations during the lessons).

3 Purpose and context of the present study

The current study aims to gain insight into what teachers learn when they participate in a RLS. Although we have some insight into the perceptions of teachers toward HA students and the educational practices they apply, more insight is needed about the perceived realities of teachers when they participate in a RLS. In this in-depth longitudinal qualitative study, we will capture teachers' learning experiences to determine whether they are associated with changes in their beliefs or frame of reference and their educational practices when participating in a RLS.

As former research indicated that meaning-oriented teacher learning increases when participating in a RLS (Vermunt et al., 2023; Vermunt et al., 2019), we expect teachers to become more critical of their own beliefs. Therefore, we expect teachers to have multiple learning experiences through RLS that lead to learning gains in their frame of reference and their educational practices. We describe learning gains as confirmations or adjustments in teachers' frame of reference and their educational practices. Learning gains can be both positive and negative. In this study, we aim to clarify these learning gains, which leads to the following research questions: (1) What learning gains do teachers report concerning their frame of reference when participating in a RLS? And (2) What learning gains do teachers report concerning their educational practices when participating in a RLS?

In a former study conducted in this research context, four teacher profiles were distinguished based on their frame of reference and related educational practices (Barbier, Struyf, & Donche, 2022). Teachers could either have a more limited or extended frame of reference, combined with a less or a more extensive repertoire of educational practices when teaching HA students. The teachers that were involved in the study of Barbier, Struyf and Donche (2022),

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

also participated in this study. This way, we can investigate the relationship between the learning gains and this initial profile. Since learning gains can depend on teachers' initial profile (before a RLS), the third research question central in this study is: (3) Are teachers' learning gains related to their (initial) teacher profile?

4 Method

4.1 Sample

To obtain a rich sample, we opted for a purposive sampling strategy. Schools interested in participation could register by filling out an online questionnaire. Besides technical questions ("What grade are you teaching?" or "How many years of teaching experience do you have?") and motivational questions ("Why do you want to participate in this study?"), we also asked specific questions about teaching HA students (e.g., "Do you have knowledge of high-ability students who will be in your class next school year?" or "Have you followed relevant courses that help you support HA students?"). As the transition from elementary to secondary education is crucial for HA students (Obergriesser & Stoeger, 2016), we chose to focus on the early school career (5th to 8th grade). In addition, by including both elementary and secondary education, we aimed to obtain a rich dataset with enough variety in educational practices. The sampling resulted in a selection of thirteen teachers from six schools (with one drop out). The schools were distributed across Flanders, covering all five Flemish provinces. Predominantly situated in rural settings, none of the schools were located within a metropolitan context. The teachers from secondary education were teaching in the academic track (A-stream)[1]. In the 8th grade, students in the A-stream can choose between different subjects (e.g. classical languages or STEM). There were no special programs for high-ability students in the schools. In each school, one teacher team participated in RLS. All teachers were confronted with diversity in their classrooms, such as students' ability levels (including HA students with an IQ of 120 or more). We selected teachers with a mix of teaching experience, both in general and with HA students. In addition, we selected motivated teachers who had some experience with HA students but were still searching for effective educational practices. We assured the teachers of confidentiality and anonymity and obtained written consent. Table 1 presents the background characteristics of the respondents.

Background Characteristics

Teacher	School	School level	Grade	Gender	Course	Teaching experience (in year)	Profile (see table 3)
Kris	School 1	Elementary	6th grade	M	General	15	3
Hannah	School 1	Elementary	5th grade	F	General	24	1
Jan	School 2	Elementary	5th grade	M	General	25	3
Ben	School 2	Elementary	6th grade	M	General	10	4
Charlotte	School 2	Elementary	5th grade	F	General	4	4
Julia	School 3	Elementary	6th grade	F	General	14	1
Hans	School 3	Elementary	5th grade	M	General	8	2
Binita	School 4	Secondary	8th grade	F	Mathematics	21	4
Lies	School 5	Secondary	8th grade	F	Language	8	2
Eva	School 5	Secondary	8th grade	F	Language	12	4
Anneleen	School 6	Secondary	8th grade	F	Mathematics	21	2
Maria	School 6	Secondary	8th grade	F	Mathematics	13	4

Note. One teacher in school 4 dropped out after the second RLS and is not represented in this Table. In addition, Charlotte was absent during RLS3; she was only present for the planning of RLS3. Charlotte participated in both interviews and was retained in the final dataset.

4.2 Instruments

The case students in the RLS were HA students who were selected based on a standardized cognitive ability test (CoVaT-CHC) (Magez et al., 2015). The CoVat-CHC is grounded in the Cattell-Horn-Carroll's-Model of intelligence (Horn & Cattell, 1966), gauged both fluid and crystallized intelligence. Its validity was established through both content (Tierens, 2015) and criterion validity (Magez & Bos, 2015). Tierens and Magez (2016) studied the reliability of the CoVat-CHC test and used the Guttman's Lambda 2 to estimate reliability (Callender & Osburn, 1979). The reliability coefficients of the broad cognitive skills range from .84 to .96. According to the European Federation of Psychologists' Associations (EFPA) guidelines, the reliability coefficients of the measured cognitive skills indicate good to very good reliability (Evers et al., 2013). The total IQ (.97) of the CoVaT – CHC Basic Version shows very good (EFPA) reliability (Tierens & Magez, 2016). This test was administered during class sessions, overseen by a trained member of the research team. Each student's performance was calibrated against a representative norming sample to derive an IQ score. Those scoring in the top 10% of their age group (IQ ≥ 120) were categorized as having high cognitive ability.

We also conducted repeated in-depth semi-structured teacher interviews during one school year. The interviews took place after the second RLS, and after the third RLS. Specific questions were asked about what they learned during

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

the RLS, with following topics: research lessons RLS ('Why did you choose this approach?' or 'What did you learn during the research lessons?'), the frame of reference HA students (e.g., 'What did you learn about HA students?' or 'how do you recognize HA students?') and educational practices ('What did you learn about educational practices for HA students?'). The aim of using repeated semi-structured interviews was to allow the respondents to express their opinions and ideas in their own words in depth so that they could determine the structure of the interview to a large extent (Savin-Baden & Howell, 2013).

4.3 Procedure
In the 2018-2019 school year, three series of RLS (each with three cycles) were organized in three primary and three secondary schools in Flanders (Belgium). The RLS was organized according to the RLS model of Dudley (2019), including selecting, observing and interviewing the case-students in each cycle of RLS. The RLS teams consisted of two to three teachers. The RLSs took place in November 2018, January 2019, and March 2019, each RLS took three to four weeks. They all focused on how teachers could create a more powerful learning environment for HA students. A detailed overview of the planning and content of the RLS of each teacher team can be found in appendix. Each teacher chose one class in which they would test out the RLS. All students in these classrooms filled in a standardized cognitive ability test (guided by someone of the research team) (Magez et al., 2015). The case students in the RLS were HA students who were selected by the research team based on this standardized cognitive ability test.

During RLS, the teacher teams participated in five workshops conducted by the researchers. At the start, they learned the necessary skills to conduct a RLS (e.g., observing, and interviewing skills). Teachers also received a RLS manual with tips and tricks and forms to use during the RLS (Bodvin et al., 2020). The researchers also provided content knowledge on educating HA students to inspire school teams to identify a theme they wanted to tackle in the RLS (e.g., providing autonomy support). In addition, there was one Q&A session with an expert on teaching HA students. During the workshops, the RLS teams had the opportunity to discuss their experiences and share their insights concerning teaching HA students.

The interviews were conducted in February 2019 and May 2019 (in total 24 interviews). Each interview lasted for approximately 40 minutes. The researcher recorded all interviews digitally. The first author conducted the interviews and the analyses. In addition, peer debriefing, which contributes to the validity and reliability of the research (Savin-Baden & Howell, 2013), was used involving regular discussions between the first author and the coauthors regarding the research process, the choices and analyses that were made, and the conclusions. This study was carried out in accordance with the Ethics Committee for the Social Sciences and Humanities of the University of Antwerp.

K. Barbier, E. Struyf , and V. Donche

4.4 Analysis

First, the 24 interviews were transcribed verbatim. Next, the quality of this process was checked by reading the text while listening to the audio fragments and misunderstandings were further corrected. In the last phase of writing this article, the selected quotes from the database were translated from Dutch into English. To minimize the loss of meaning inherent in the translation process (Hammersley, 2010), a bilingual researcher was involved.

To answer research questions one and two, we inductively coded the interviews using Nvivo (version R1.6.1), focusing on teachers' learning gains. As a first step, we coded the learning gains; this could be either an adjustment or a confirmation of beliefs or educational practices. For instance, when teachers had a learning experience that led to an adaption in their frame of reference or their educational practices, the code 'adjustment' was allocated (E.g., *'I used to think HA students, are those who do nothing for school. Actually, that is not the case. They are just processing things a lot faster.')*. When teachers had a learning experience that led to a confirmation of their frame of reference or their educational practices, the code 'confirmation' was allocated (E.g., *'We already knew that compacting the curriculum worked for HA students.'*). We also used value coding, meaning that a learning experience was either positive (e.g., *'The HA students enjoyed it when they got more freedom')* or negative (e.g., *'They did not go as fast as I hoped.'*). In a second step, each learning experience was inductively coded on content: What was the learning experience about? We first used inductive coding within the two categories 'frame of reference' and 'educational practices' to get a more detailed view on what teachers learned. Next, deductive coding was used to structure the codes following the coding tree from the study of Barbier, Struyf and Donche (2022) (see Table 2). Codes within one interview that pointed to the same learning experience were grouped and coded as one learning experience.

To answer research question three, we looked into the four profiles based upon the investigation of teachers' initial profiles (Barbier, Struyf, & Donche, 2022). By attributing the four teacher profiles found in the former interview study to the present data, we could investigate if the learning gains were related to teachers' initial profiles at the starting point of the RLS.

To increase the reliability of the coding, we asked a research assistant experienced with qualitative data analysis, to code a sample (three interviews) of our data, based on a given coding tree with the three broad categories and the main codes. When comparing the sub- and main codes, Cohen's kappa indicated a good agreement, respectively $k=0.61$ and $k=0.66$. This further underlines the quality of our coding (Fleiss, 1971). In addition, this step was also discussed via peer debriefing sessions with all co-authors.

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

5 Results

In what follows, we detail more on the learning gains teachers reported concerning their frame of reference and their educational practices. Afterwards we relate teachers' initial profiles to their learning gains.

5.1 What learning gains do teachers report concerning their frame of reference?

Regarding the first research question, teachers reported learning gains on various topics (see Table 2). First, they had a more in-depth understanding of the cognitive abilities of HA students. For example, by observing and interviewing the HA students, they understood why HA students are not necessarily cognitively strong in all domains:

> We have a lot of diversity. We have six case pupils now. They are all different. I start noticing it more and more, yes. Differences in behavior, in character, in attitude to work, in everything actually yes. HA students are very diverse. They are not just smart on paper, in terms of getting good results. So that's an enrichment (Charlotte, February 2019).

Second, RLS was an eye-opener for the majority of the teachers and confronted them with their misconceptions, e.g., HA students do not always lack socio-emotional skills. Teachers had many learning experiences concerning the differences between individual HA students in terms of motivation, classroom behavior, social skills, and other characteristics. Most of these learning experiences were positive:

> My image about HA students has changed immensely because of the acquired insights through RSL. Well, I saw my own child and I thought that that was the general picture of a HA child (demotivated, less socially capable). Whereas that's not the case at all, I was completely wrong. So, my understanding has changed completely. (Hannah, February 2019).

5.2 What learning gains do teachers report concerning their educational practices?

Regarding the second research question, teachers reported considerable learning gains that led to a positive adaption of their educational practices. Learning gains concerning the educational practices can be categorized in methods, learning tasks, and guidance (see Table 2).

Methods. The most important learning gain on effective teaching methods was to give HA students more autonomy and responsibility. Teachers had mostly positive learning experiences with giving HA students more autonomy:

> The effect of autonomy is something I noticed a lot with these high-ability children. If they are allowed to go ahead on their own and do some exercises, then they are more involved. (...) I feel that they continue their drive (motivation) in the other lessons as well. (...) They don't slump and think 'okay, we mustn't do it, so we're not going to do it'. So, giving them that freedom is beneficial. (Anneleen, May 2019).

In addition, a minority of teachers learned that active teaching methods (e.g., forming a student 'expert' group to solve advanced problems) are most effective to practice and process theory, rather than learning the theory itself. Moreover, more than half of the teachers expressed that they experienced the effectiveness of compacting and enrichment. Although most of them already coined the method as effective, they now explored it themselves through RLS. Furthermore, less than half of teachers also tried out 'flip the classroom', where all students had to watch or read the teachers' instructions at home. Teachers learned that this method allowed them to spend their class time more efficiently and compact and enrich learning content for HA students. Teachers had both negative and positive experiences with homogeneous and heterogeneous grouping. Additionally, half of the teachers had mixed learning experiences on individual work. For example, one teacher did not expect that HA students preferred working in group, while another teacher was surprised that so many students chose to work individually. There were also mixed experiences on using the question-and-answer method (Socratic Dialogue). This worked especially well when new learning content was treated. When HA students had already acquired particular knowledge, the teachers found a Socratic Dialogue not challenging enough for them.

Learning Tasks. Including context and students' interests in learning tasks was another important learning gain for teachers. The teachers tried to provide authentic exercises (e.g., including the names of the students in a literary text), and they adapted tasks to students' interests (e.g., choosing a text on gaming). Especially for lessons where teachers needed to repeat learning content, they found that HA students were motivated when they found the exercises interesting. Teachers experimented and searched for tasks that were not too easy and not too difficult for HA students. They learned about the needs of

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

their HA case students and that learning tasks should always be attuned to the individual student. They became also aware that the tasks they used for these students might not work for other students the following school year.

Guidance. Most of the teachers stressed the importance of guidance, giving feedback, and providing structure when HA students worked autonomously. Teachers had both positive and negative learning experiences in this regard: too much autonomy did not lead to the desired learning outcome. Teachers learned that guidance and structure were needed, even for HA students, especially if they had more autonomy to choose exercises or work independently:

> Yes, on the right side of the board are all the students' name cards and at the top are the questions. It's handy because you can see if two students have the same question, you can explain it for the both. (…) By 'parking' their questions on the board, they can just let go and get on with other exercises. (Julia, February 2019).

5.3 Learning gains throughout RLS
When looking into the learning gains, there are some overall trends. For a minority of teachers, their learning gains meant a confirmation of their frame of reference or their educational practice. Still, most teachers adapted their frame of reference and practice when participating in RLS. Also, teachers adapted their frame of reference and their educational practices, primarily based on positive learning experiences. Nevertheless, also negative learning experiences could lead to changes in their frame of reference or their educational practices, for example:

> They still have so much need for validation "Am I doing it right?", which undermines the whole idea of independent work. Because it is not quiet in the classroom, and you need that for working autonomously. They really want you to come and check after each step, "Teacher, am I doing well?". And we then say, "Yes, you're doing well." So, working with a lot of autonomy, well, it didn't work well for me. Not for learning new things, anyway. (Eva, February 2019)

Furthermore, more than half of the total amount of learning gains occurred after the second RLS. The learning gains diminished after the third research lesson but were still numerous (see Table 2).

251

Coding Scheme of Main Themes and Results

Name	Description	Reported learning gains after RLS1-2	Reported learning gains after RLS3
Learning experience	The learning experience led to a confirmation or an adjustment of the frame of reference and/or the educational practices.	107 (n=12)	95 (n=12)
Adjustment	The teacher reported changes in his or her views because of a learning experience (e.g., "I learned", "I didn't know" or "It's different"). The learning experience can both be positive or negative.	98 (n=12)	87 (n=12)
	The reported change was based on a positive learning experience.	75 (n=12)	59 (n=12)
	The reported change was based on a negative learning experience.	23 (n=10)	28 (n=9)
Confirmation	The teacher retained his or her views because of a learning experience (e.g., "as I already knew" or "It still remains…"). In this study, only positive learning experiences led to a confirmation.	9 (n=5)	8 (n=6)
Frame of reference	The learning experience affected teacher's beliefs about high-ability students.	43 (n=12)	47 (n=12)
Cognitive functioning	The teacher claimed to have learned about cognitive functioning of high-ability student(s): cognitive abilities (e.g., high IQ), cognitive processing (e.g., students can quickly process learning material), meta-cognitive strategies (e.g., excellent planning and managing their own learning) or academic performance (e.g., good or underperforming).	17 (n=11)	20 (n=10)
Specific characteristics	The teacher claimed to have learned about personal traits that they link to cognitive ability, such as smart-minded, responsible, and timid or having a sense of justice.	7 (n=6)	17 (n=8)
Motivation	The teacher claimed to have learned about the motivation of high-ability students. This can be about intrinsic motivation, performance motivation, or no motivation.	8 (n=8)	4 (n=4)
Social skills	The teacher claimed to have learned about the functioning of high-ability students interacting with the teacher and/or the other students (e.g., high-ability students have trouble interacting with peers).	6 (n=5)	4 (n=4)
Classroom behavior	The teacher claimed to have learned about the classroom behavior of high-ability students. The teacher talked about highly engaged students, bored students, or students who show no engagement in the classroom.	5 (n=5)	2 (n=2)
Educational practices for high-ability students	The learning experience affected the teacher's views on suitable educational practices for high-ability students.	64 (n=12)	48 (n=11)

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

Methods	The teacher claimed to have learned about the methods they use in teaching high-ability students (e.g., differentiating in class, giving students choices, peer teaching, group work, or a Socratic dialogue for high-ability students).	33 (n=12)	31 (n=10)
Learning tasks	The teacher claimed to have learned about different learning tasks that they use when teaching high-ability students: e.g., ICT assignments, games and tasks that match their interests.	17 (n=9)	12 (n=7)
Guidance	The teacher claimed to have learned about how they support high-ability students and give feedback in daily classroom practice.	14 (n=8)	5 (n=3)

Note. The numbers indicate the amount of reported learning experiences. The numbers in parentheses (n=) indicate the number of respondents.

5.4 Relating learning gains to the teacher's initial profiles

Besides gaining insight into the learning gains of teachers about educating HA students, the current study also aimed to gain insight into how the teacher's initial profiles matter in the learning process of a RLS.

Looking at the four profiles and their learning experiences (see Table 3), we note that profile 4, teachers who had a limited frame of reference and a less extended repertoire of educational practices, had on average the fewest learning experiences. Especially in RLS3, teachers reported few learning gains. We also observe that in the first and second RLS, teachers in this profile had more learning experiences in educational practices than in the frame of reference. In RLS3, it is the opposite way; teachers had slightly more learning experiences in the frame of reference. Teachers in profiles 2 and 3, who had an extended frame of reference combined with a less extended repertoire of educational practices or a limited frame of reference combined with a more extended repertoire of educational practices, reported the most learning experiences. They had more or less the same amount of learning experiences throughout the whole RLS process. When looking at learning experiences in educational practices versus the frame of reference, teachers in profiles 2 and 3 show slightly more learning experiences in educational practices. Especially in the first and second RLS, there was a rather significant difference for teachers in profile 3. Teachers in profile 1, who had an extended frame of reference and a more extended repertoire in educational practices, had moderate learning gains both in RLS 1 and RLS 2 and in RLS 3. They also reported about the same amount of learning experiences in educational practices and their frame of reference.

Table 3

Teachers' prior beliefs (frame of reference and educational practices) before the start and learning gains during RLS.

	PROFILE 1	PROFILE 2	PROFILE 3	PROFILE 4
Frame of reference	*extended*	*extended*	*limited*	*limited*
Educational practices	*extended*	*limited*	*extended*	*limited*
Learning gains in the frame of reference (RLS1 & RLS2)	*high*	*very high*	*medium*	*low*
Learning gains in educational practices (RLS1 & RLS2)	*high*	*very high*	*very high*	*very high*
Learning gains in the frame of reference (RLS3)	*high*	*very high*	*high*	*medium*
Learning gains in educational practices (RLS3)	*high*	*very high*	*very high*	*low*

Note. low < 3 learning gains; medium ≥ 3 learning gains and < 4 learning gains; high ≥ 4 learning gains and < 5 learning gains; very high ≥ 5 learning gains.

6 Conclusion and discussion

The present study aimed at enhancing insight into teachers' frames of reference and educational practices regarding HA students when participating in RLS. By looking at the learning gains and mapping their adaptions or confirmations of their frame of reference and their educational practices during repeated interviews, we were able to further examine the perceived impact of RLS on teachers' frames of reference and practices across time.

Regarding the first research question, we conclude that teachers became more critical towards their own frame of reference. Teachers reported learning gains on various topics. They had a better understanding of the cognitive abilities of HA students, they refuted misconceptions and learned more about personal differences between HA students. These are important findings since misconceptions on HA students can lead to misidentification and misjudgment (Baudson & Preckel, 2016; Parsons et al., 2018). Also, when looking at theoretical frameworks, we see that personal and environmental factors can enhance or hamper the development of students' high cognitive abilities into outstanding mastery (Siegle & McCoach, 2005).

Regarding the second research question, we found that RLS had a positive impact on teacher learning as teachers increased or adapted their present knowledge and skills regarding educational practices for HA students. In general,

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding
high-ability students
K. Barbier, E. Struyf , and V. Donche

teachers reported considerable learning gains that led to a positive adaptation of their educational practices. Most practices were in line with previous (review) studies on teaching HA students, like enhancing self-regulated learning or compacting and enriching the curriculum (Jen, 2017; VanTassel-Baska, 2018). Still, for some educational practices, teachers also reported negative learning gains (e.g., teachers had mixed experiences with homogeneous grouping).

It is important to keep in mind that educational practices found effective in previous (review) studies are always conducted in specific educational contexts in different countries. Therefore, it is not surprising that teachers have different learning gains in specific educational practices since they teach in different grades, domains, classes, or school contexts. It remains important to always consider the needs that exist in each student group, class, or school to evaluate a chosen educational approach as effective or whether the approach needs some adjustments.

Concerning the third research question, it was indicated that teachers who had an extended frame of reference combined with a less extended repertoire of educational practices, or a limited frame of reference combined with a more extended repertoire of educational practices seem to benefit the most when participating in RLS. For teachers who already had an extended frame of reference and repertoire of educational practices, RLS contributed to teachers' beliefs and their practice, but to a lesser extent. Possibly, there is a kind of ceiling effect for teachers participating in RLS who already have more extensive prior knowledge and skills on educating HA students. Compared to the other profiles, teachers with a limited frame of reference and a limited repertoire of educational practices (profile 4) had few(er) learning experiences when participating in a RLS. One explanation for these limited learning gains is that these teachers might have few (mis)conceptions about and little knowledge of educational practices for HA students. Within this limited prior knowledge, it might be hard to challenge beliefs and practices through RLS. Moreover, RLS is an autonomy-supportive way of professional development. It is also possible that these teachers need more feedback and external regulation or guidance to facilitate their learning process or even more time. Based on these results, differences in prior knowledge are related to specific learning gains obtained in a RLS.

To explain the overall positive results of RLS found in this empirical study, we can refer to research on effective professional development. Throughout the years, several researchers mapped relevant research on effective teacher professional development (Borko, 2004; Desimone, 2009; Merchie et al., 2018). Merchie et al. (2018) offer a current and interesting framework based upon a systematic narrative synthesis of professional development initiatives. This framework can be used to assess (the effectiveness of) professional development. Merchie et al. (2018) identify nine crucial features that are proven effective when developing a professional development initiative. These features

255

PEDAGOGISCHE
STUDIËN

https://doi.
org/10.59302/
d8wnk877

K. Barbier, E. Struyf , and V. Donche

are also found in RLS: (1) The RLS content is focused on student learning; (2) Teachers have pedagogical knowledge and skills to teach the content that is of focus in the RLS; (3) The RLS initiative is in line with the school team's goals, standards, and current reforms and is informed by theory and research evidence; (4) Teachers can exercise ownership of the RLS content and process; (5) The RLS is an extended and intensive program; (6) RLS stimulates collaboration with internal and external peers; (7) RLS is incorporated into teachers' daily work; (8) RLS stimulates active learning through a continuous inquiry of practice and reflection on professional and academic knowledge; and (9) The RLS facilitator's knowledge and skills align with the needs and demands of the school team members. According to Merchie et al. (2018) the features can impact teacher learning, with teachers increasing or adapting their frame of reference. This is also reflected in this qualitative study. Furthermore, the framework of Merchie et al. (2018) also points out that improved teacher learning can lead to improved teaching behavior. These changes can then affect student learning. Therefore, we recommend gaining further insight into teachers' daily behavior through observation. Moreover, for future research, it would be to include students' perceptions on educational practices and student learning when studying the impact of RLS on teaching HA students.

To interpret our findings, some limitations need to be considered. First, this in-depth longitudinal interview study is exploratory, given the paucity of research on the relationship of beliefs and educational practices of teachers in regular classrooms regarding HA students. To further investigate the development of teachers' beliefs and educational practices and understand the role of their initial profiles, a more diverse qualitative sample might be interesting to include (e.g., different types of school contexts). Further, by carrying out repeated interviews, we were able to better understand how teachers reported to learn when participating in a RLS. In these interviews, we grasped teachers' perceived realities. In future studies, it would be interesting to gain more insight into teachers' (implicit) learning processes concerning HA students. One way to do this is by studying teachers' dialogues during a RLS in more depth (Vrikki et al., 2017). It would be interesting to further explore how teachers might build upon each other's ideas and how teachers' initial profiles possibly contribute to the dialogues. In addition, it would be interesting to further analyze which parts of RLS (study, plan, teach or reflect) lead to learning gains.

We conclude that collaborative classroom-based research using the method of RLS led to learning gains for teachers. The learning gains confirmed many of the former findings regarding fostering HA students, which are highly relevant to providing an appropriate education for these students. Based on this qualitative study, it was indicated that RLS, in line with the framework of Merchie et al. (2018), is an effective professional development initiative and

256

**PEDAGOGISCHE
STUDIËN**
https://doi.
org/10.59302/
d8wnk877

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

contributes to teachers' learning. Teachers reported learning gains concerning their frame of reference and educational practices. Still, teachers with limited beliefs, knowledge, and practices regarding HA teaching, seemed to learn less than other teachers which raises further research questions about the role of more feedback, support or time. These findings contribute to the RLS research field. Up until this study, there were no peer reviewed impact studies in the Flemish educational context. Furthermore, impact studies on RLS in general are often limited in time (Puchner & Taylor, 2006; Ylonen & Norwich, 2013). This study contributes to the RLS field by engaging teachers in multiple cycles during one school year. Also, there were multiple teams involved from different educational contexts, which led to a rich sample. Teachers indicated that they found the exchange between different educational contexts an added value. The results of this study are also relevant for teachers. Both for in-service teachers and teachers-in-training it seems crucial that teachers develop an accurate and extended frame of reference on HA students to provide an appropriate education for these students. We recommend teachers and schools to conduct RLS to optimize beliefs about HA students and facilitate the development of relevant educational practices.

Data availability statement
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy restrictions.

257

Noot

1   First stage secondary education in Flanders is divided into two tracks: the A-stream which is followed by a majority of pupils and the B-stream. The A-stream is an academic track, while the B-stream prepares students for vocational education.

References

Aas, H. K., Uthus, M., & Lohre, A. (2023). Inclusive education for students with challenging behaviour: development of teachers' beliefs and ideas for adaptations through Lesson Study. *European Journal of Special Needs Education*. https://doi.org/10.1080/08856257.2023.2191107

Bakx, A., Van Houtert, T., van de Brand, M., & Hornstra, L. (2017). A comparison of high-ability pupils' views vs. regular ability pupils' views of characteristics of good primary school teachers. *Educational Studies, 45*(1), 35-56. https://doi.org/10.1080/03055698.2017.1390443

Barbier, K., Struyf, E., & Donche, V. (2022). Teachers' beliefs about and educational practices with high-ability students. *Teaching and Teacher Education, 109*, 1-12. https://doi.org/10.1016/j.tate.2021.103566

Barbier, K., Struyf, E., Verschueren, K., & Donche, V. (2022). Fostering cognitive and affective-motivational learning outcomes for high-ability students in mixed-ability elementary classrooms: A systematic review. *European Journal of Psychology of Education*. https://doi.org/10.1007/s10212-022-00606-z

Baudson, T. G., & Preckel, F. (2013). Teachers' implicit personality theories about the gifted: An experimental approach. *School Psychology Quarterly, 28*(1), 37-46. https://doi.org/10.1037/spq0000011

Baudson, T. G., & Preckel, F. (2016). Teachers' conceptions of gifted and average-ability students on achievement-relevant dimensions. *Gifted Child Quarterly, 60*(3), 212-225. https://doi.org/10.1177/0016986216647115

Bodvin, K., Barbier, K., Struyf, E., & Donche, V. (2020). *Lesson Study: Samen de klaspraktijk voor leerlingen verbeteren*. Acco Uitgeverij.

Boncquet, M., Flamant, N., Lavrijsen, J., Vansteenkiste, M., Verschueren, K., & Soenens, B. (2023). The unique importance of motivation and mindsets for students' learning behavior and achievement: An examination at the level of between-student differences and within-student fluctuations. *Journal of Educational Psychology*, No Pagination Specified-No Pagination Specified. https://doi.org/10.1037/edu0000827

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher, 33*(8), 3-15. https://doi.org/10.3102/0013189x033008003

Brevik, L. M., Gunnulfsen, A. E., & Renzulli, J. S. (2018). Student teachers' practice and experience with differentiated instruction for students with higher learning potential. *Teaching and Teacher Education, 71,* 34-45. https://doi.org/https://doi.org/10.1016/j.tate.2017.12.003

Brighton, C. M. (2003). The effects of middle school teachers' beliefs on classroom practices. *Journal for the Education of the Gifted, 27*(2-3), 177-206. https://doi.org/10.1177/016235320302700205

Callender, J. C., & Osburn, H. G. (1979). An empirical comparison of coefficient alpha, Guttman's lambda-2, and MSPLIT maximized split-half reliability estimates. *Journal of Educational Measurement, 16*(2), 89-99. https://doi.org/10.1111/j.1745-3984.1979.tb00090.x

Dai, D. Y., & Chen, F. (2013). Three paradigms of gifted education: In search of conceptual

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

clarity in research and practice. *Gifted Child Quarterly, 57*(3), 151-168. https://doi.org/10.1177/0016986213490020

Dare, L., & Nowicki, E. (2020). 'The road less travelled': grade-level acceleration in inclusive schools. *International Journal of Inclusive Education*, 1-17. https://doi.org/10.1080/13603116.2020.1837265

Dare, L., Nowicki, E. A., & Smith, S. (2019). On deciding to accelerate: High-ability students identify key considerations. *Gifted Child Quarterly, 63*(3), 159-171. https://doi.org/10.1177/0016986219828073

Desimone, L. (2009). Improving impact studies of teacher professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*, 181 - 199. https://doi.org/10.3102/0013189X08331140

Dudley, P. (2019). *Lesson Study: A handbook.* Cambridge University.

Evers, A., Muñiz, J., Hagemeister, C., Høtmælingen, A., Lindley, P., Sjöbergr, A., & Bartram, D. (2013). Assessing the quality of tests: revision of the EFPA review model. *Psicothema, 25*(3), 283-291. https://doi.org/10.7334/psicothema2013.97

Fives, H., & Buehl, M. (2008). What do teachers believe? Developing a framework for examining beliefs about teachers' knowledge and ability. *Contemporary Educational Psychology, 33*, 134-176.

Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. *Psychological Bulletin, 76*(5), 378-382. https://doi.org/10.1037/h0031619

Flores, B. B. (2001). Bilingual education teachers' beliefs and their relation to self-reported practices. *Bilingual Research Journal, 25*, 275 - 299.

Gagné, F. (2004). Transforming gifts into talents: The DMGT as a developmental theory. *High Ability Studies, 15*(2), 119-147. https://doi.org/10.1080/1359813042000314682

García-Martínez, I., Cáceres, R., Rosa, A., & P. León, S. (2021). Analysing educational interventions with gifted students. Systematic review. *Children*, 365. https://doi.org/10.3390/children8050365

Hammersley, M. (2010). Reproducing or constructing? Some questions about transcription in social research. *Qualitative Research, 10*(5), 553-569. https://doi.org/10.1177/1468794110375230

Heller, K. A., Mönks, F. J., Subotnik, R., & Sternberg, R. (2000). *International handbook of giftedness and talent.* Elsevier.

Horn, J. L., & Cattell, R. B. (1966). Refinement and test of the theory of fluid and crystallized general intelligences. . *Journal of Educational Psychology, 57*(5), 253-270. https://doi.org/https://doi.org/10.1037/h0023816

Jen, E. (2017). Affective interventions for high-ability students from 1984-2015: A review of published studies. *Journal of Advanced Academics, 28*(3), 225–247. https://doi.org/10.1177/1932202X17715305

Lavrijsen, J., Preckel, F., Verachtert, P., Vansteenkiste, M., & Verschueren, K. (2021). Are motivational benefits of adequately challenging schoolwork related to students' need for cognition, cognitive ability, or both? *Personality and Individual Differences, 171*, 110558. https://doi.org/10.1016/j.paid.2020.110558

Lavrijsen, J., & Verschueren, K. (2020a). Student characteristics affecting the recognition of high cognitive ability by teachers and peers. *Learning and Individual Differences, 78*, 1-10. https://doi.org/10.1016/j.lindif.2019.101820

Lavrijsen, J., & Verschueren, K. (2020b). Student characteristics affecting the recognition of high cognitive ability by teachers and peers. *Learning and Individual Differences, 78*, 101820. https://doi.org/10.1016/j.lindif.2019.101820

Lawrence, C. A., & Chong, W. H. (2010). Teacher collaborative learning through the lesson study: identifying pathways for instructional success in a Singapore high school. *Asia Pacific Education Review, 11*(4), 565-572. https://doi.org/10.1007/s12564-010-9103-3

Lewis, C. (2009). What is the nature of knowledge development in lesson study? *Educational Action Research, 17*(1), 95-110. https://doi.org/10.1080/09650790802667477

Lewis, C., Friedkin, S., Emerson, K., Henn, L., & Goldsmith, L. (2019). How Does Lesson Study Work? Toward a Theory of Lesson Study Process and Impact. In R. Huang, A. Takahashi, & J. P. da Ponte (Eds.), *Theory and Practice of Lesson Study in Mathematics: An International Perspective* (pp. 13-37). Springer International Publishing. https://doi.org/10.1007/978-3-030-04031-4_2

Lewis, J., Fischman, D., Riggs, I., & Wasserman, K. (2013). Teacher learning in Lesson Study. *The Mathematics Enthusiast, 10*, 583-620. https://doi.org/10.54870/1551-3440.1281

Magez, W., & Bos, A. (2015). *Validiteit wederzijdse relatie schoolse criteria - testresultaten [Validity relationship educational criteria – test results].*

Magez, W., Tierens, M., Van Huynegem, J., Van Parijs, K., Decaluwé, V., & Bos, A. (2015). *Co-VaT-CHC: Cognitieve vaardigheidstest volgens het CHC-model [CoVaT-CHC: Cognitive ability test based on the CHC-model].*

Meirink, J. A., Meijer, P. C., Verloop, N., & Bergen, T. C. M. (2009). Understanding teacher learning in secondary education: The relations of teacher activities to changed beliefs about teaching and learning. *Teaching and Teacher Education, 25*(1), 89-100. https://doi.org/https://doi.org/10.1016/j.tate.2008.07.003

Merchie, E., Tuytens, M., Devos, G., & Vanderlinde, R. (2018). Evaluating teachers' professional development initiatives: Towards an extended evaluative framework. *Research Papers in Education, 33*(2), 143-168. https://doi.org/10.1080/02671522.2016.1271003

Obergriesser, S., & Stoeger, H. (2016). The influence of emotions and learning preferences on learning strategy use before transition into high-achiever track secondary school. *High Ability Studies, 27*(1), 5-38. https://doi.org/10.1080/13598139.2015.1100980

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-332. https://doi.org/10.3102/00346543062003307

Preckel, F., Baudson, T. G., Krolak-Schwerdt, S., & Glock, S. (2015). Gifted and maladjusted? Implicit attitudes and automatic associations related to gifted children. *American Educational Research Journal, 52(*6), 1160-1184. https://doi.org/10.3102/0002831215596413

Puchner, L. D., & Taylor, A. R. (2006). Lesson study, collaboration and teacher efficacy: Stories from two school-based math lesson study groups. *Teaching and Teacher Education, 22*(7), 922-934. https://doi.org/10.1016/j.tate.2006.04.011

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

Ramos, A., Lavrijsen, J., Soenens, B., Vansteenkiste, M., Sypré, S., & Verschueren, K. (2021). Profiles of maladaptive school motivation among high-ability adolescents: A person-centered exploration of the motivational pathways to underachievement model. *Journal of Adolescence, 88*, 146-161. https://doi.org/10.1016/j.adolescence.2021.03.001

Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly, 44*(3), 152–170. https://doi.org/10.1177/001698620004400302

Renzulli, J. S. (2005). The three-ring conception of giftedness: A developmental model for creative productivity. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of Giftedness* (pp. 246–279). Cambridge University Press. https://doi.org/10.1017/CBO9780511610455.015

Robinson, N. M. (2002). Individual differences in gifted students' attributions for academic performance. In M. Neihart, S. M. Reis, N. M. Robinson, & S. M. Moon (Eds.), *The social and emotional development of gifted children: What do we know?* (pp. 61-69). Prufrock Press.

Savin-Baden, M., & Howell, M. C. (2013). *Qualitative research: The essential guide to theory and practice.* Routledge.

Scager, K., Akkerman, S. F., Pilot, A., & Wubbels, T. (2014). Challenging high-ability students. *Studies in Higher Education, 39*(4), 659-679. https://doi.org/10.1080/03075079.2012.743117

Scager, K., Akkerman, S. F., Pilot, A., & Wubbels, T. (2017). Teacher dilemmas in challenging students in higher education. *Teaching in Higher Education, 22*(3), 318-335. https://doi.org/10.1080/13562517.2016.1248392

Seleznyov, S. (2019). Lesson study beyond Japan: Evaluating impact. *International Journal for Lesson and Learning Studies, 8*(1), 2-18. https://doi.org/10.1108/IJLLS-09-2018-0061

Siegle, D., & McCoach, D. B. (2005). *Motivating gifted students*. Prufrock Press.

Subotnik, R. F., Olszewski-Kubilius, P., & Worrell, F. C. (2011). Rethinking giftedness and gifted education: A proposed direction forward based on psychological science. *Psychological Science in the Public Interest, 12*(1), 3-54. https://doi.org/10.1177/1529100611418056

Terman, L. M. (1925). *Mental and physical traits of a thousand gifted children.* (Vol. 1). Stanford University Press.

Tierens, M. (2015). *Onderzoeksrapport Constructvaliditeit [Research Report: Construct Validity].*

Tierens, M., & Magez, W. (2016). *COVAT – CHC basisversie onderzoeksrapport: Onderzoeksrapport betrouwbaarheid en betrouwbaarheidsintervallen.*

VanTassel-Baska, J. (2018). Achievement unlocked: Effective curriculum interventions with low-income students. *Gifted Child Quarterly, 62*(1), 68-82. https://doi.org/10.1177/0016986217738565

Vermunt, J., Vrikki, M., Dudley, P., & Warwick, P. (2023). Relations between teacher learning patterns, personal and contextual factors, and learning outcomes in the context of Lesson Study. *Teaching and Teacher Education, 133.* https://doi.org/10.1016/j.tate.2023.104295

261

Vermunt, J., Vrikki, M., van Halem, N., Warwick, P., & Mercer, N. (2019). The impact of Lesson Study professional development on the quality of teacher learning. *Teaching and Teacher Education, 81*, 61-73. https://doi.org/10.1016/j.tate.2019.02.009

Vrikki, M., Warwick, P., Vermunt, J., Mercer, N., & van Halem, N. (2017). Teacher learning in the context of Lesson Study: A video-based analysis of teacher discussions. *Teaching and Teacher Education*. https://doi.org/10.17863/CAM.7057

Weyns, T., Preckel, F., & Verschueren, K. (2021). Teachers-in-training perceptions of gifted children's characteristics and teacher-child interactions: An experimental study. *Teaching and Teacher Education, 97*. https://doi.org/10.1016/j.tate.2020.103215

Willems, I., & Van den Bossche, P. (2019). Lesson Study effectiveness for teachers' professional learning: a best evidence synthesis. *International Journal for Lesson and Learning Studies, 8*(4), 257-271. https://doi.org/10.1108/IJLLS-04-2019-0031

Xu, H., & Pedder, D. (2015). Lesson Study: An international review of the research. In P. Ddley (Ed.), *Lesson Study: Professional learning for our time* (pp. 24-47). Routledge.

Ylonen, A., & Norwich, B. (2013). Professional learning of teachers through a lesson study process in England: Contexts, mechanisms and outcomes. *International Journal for Lesson and Learning Studies, 2*(2), 137-154. https://doi.org/10.1108/20468251311323388

Ziernwald, L., Hillmayr, D., & Holzberger, D. (2022). Promoting high-achieving students through differentiated instruction in mixed-ability classrooms: A systematic review. *Journal of Advanced Academics*, 1932202X2211129. https://doi.org/10.1177/1932202X221112931

262

Auteurs

Katelijne Barbier is als senior-onderzoeker en gastprofessor verbonden aan de Faculteit Sociale Wetenschappen, Departement Opleidings- en Onderwijswetenschappen, Universiteit Antwerpen.

Elke Struyf is hoogleraar onderwijswetenschappen aan de Antwerp School of Education (ASoE).

Vincent Donche is als hoogleraar verbonden aan de Faculteit Sociale Wetenschappen, Departement Opleidings- en Onderwijswetenschappen, Universiteit Antwerpen.

Correspondentie-adres: Katelijne Barbier, Sint-Jacobstraat 2, S.Z.304, 2000 Antwerpen, België.
E-mail: katelijne.barbier@uantwerpen.be

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

Samenvatting

De impact van Research Lesson Study op de opvattingen en onderwijspraktijken van leraren over cognitief begaafde leerlingen

Om gepast onderwijs te kunnen aanbieden aan cognitief begaafde leerlingen moeten leraren beschikken over relevante opvattingen, kennis en vaardigheden. Eerder onderzoek suggereert dat leraren uit het reguliere onderwijs misvattingen kunnen hebben over cognitief begaafde leerlingen en soms de nodige kennis of vaardigheden missen om een gepaste onderwijsleeromgeving te creëren. Het doel van deze studie is om te onderzoeken hoe de opvattingen en onderwijspraktijk van leraren evolueren wanneer ze deelnemen aan een professionaliseringstraject via Research Lesson Study.

Dertien leraren van zes reguliere basisscholen en secundaire scholen in Vlaanderen namen deel aan herhaalde diepte-interviews om hun ervaringen in kaart te brengen. Leraren rapporteerden leerwinst over het verfijnen van hun opvattingen en het verbeteren van hun onderwijspraktijk. De verbeterde onderwijspraktijken kwamen overeen met eerdere wetenschappelijke bevindingen over effectief lesgeven aan cognitief begaafde leerlingen. Daarnaast vertoonden leraren met beperkte opvattingen en kennis over de onderwijspraktijken minder leerwinst in vergelijking met andere leraren.

Het is van belang dat leraren een accuraat en uitgebreid referentiekader ontwikkelen met betrekking tot het adequaat lesgeven aan cognitief begaafde leerlingen. Professionalisering voor leraren via Research Lesson Study bleek uit het onderzoek effectief te zijn voor het optimaliseren van opvattingen en van relevante onderwijspraktijken met betrekking tot cognitief begaafde leerlingen.

Kernwoorden cognitief begaafde leerlingen, onderwijspraktijken, basis- en secundair onderwijs, Research Lesson Study, professionele ontwikkeling, misconcepties

263

K. Barbier, E. Struyf , and V. Donche

Appendix 1
Planning RLS (2018-2019)

Month	RLS-planning	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Sept	Reading RLS-manual, drawing up RLS collaboration group protocol and administering cognitive ability test students Workshop 1: Starting with RLS						
Oct	Workshop 2: Teaching high ability students Defining research focus RLS 1, study and planning RLS1						
Nov	RLS1: 3 cycles: plan, teach (including observe and interview) and reflect for 3 weeks	Course: Dutch Autonomy supportive teaching using instruction video's	Course: Mathematics Differentiated direct instruction, focus on sense of belonging in the classroom	Course: Mathematics Differentiated di-rect instruction, autonomy supportive guidance	Course: Dutch Independent work, coaching	Course: Mathematics Differentiated (online) learning trajectory, homogeneous group work	Course: Mathematics Modeling, group work
Dec	Workshop 3: reflecting on RLS 1, sharing results Follow-up conversation after RLS1 with facilitator, defining research focus RLS2, study and planning RLS2						
Jan	RLS2: 3 cycles: plan, teach (including observe and interview) and reflect for 3 weeks	Course: Mathematics Autonomy supportive teaching using instruction video's	Course: Dutch Differenti-ated direct instruction, flip the classroom technique	Course: Dutch Enriching tasks based on their own input, auto-nomy supportive guidance	Course: Dutch Activating working formats, inductive lear-ning	Course: Mathematcs Differentiated (online) learning trajectory, homogeneous grouping	Course: Mathematics Differentiated (online) learning trajectory
Feb	Workshop 4: reflecting on RLS2, sharing results, Q&A with an expert in high ability students Follow-up conversation after RLS2 with facilitator, defining research focus RLS3, study and planning RLS 3						

Examining the impact of Research Lesson Study on teachers' beliefs and educational practices regarding high-ability students

K. Barbier, E. Struyf , and V. Donche

Ma	RLS 3 cycles: plan, teach (including observe and interview) and reflect for 3 weeks	Course: Dutch Differentiated groupwork considering students' interest	Course: Mathematics Differentiated direct instruction, compacting, and enriching the curriculum	Course: World orientation Activating prior knowledge, project work	Course: Dutch Activating working formats, tasks based on students' interests	Course: Mathematics Differentiated instruction in the classroom, working at own pace	Course: Mathematics Homogeneous grouping (expert groups), autonomy supportive teaching
April	Valorization of results, e.g., poster with results, PowerPoint presentation, short movieclip (with the purpose to share it with colleagues within/outside the school)						
May	Valorization of results Workshop 5: presentation "lessons learned" from each team, evaluating RLS as teacher professional development						

Note. RLS is the abbreviation of Research Lesson Study

K. Barbier, E. Struyf , and V. Donche

265