Student teachers' practice and experience with differentiated instruction for students with higher learning potential

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Abstract

This article presents a qualitative study concerning student teachers' understanding of differentiation for high-achieving secondary school students. Predominantly using focus group interviews of Norwegian student teachers (N = 322), this study identified their understanding of the use and value of differentiation, drawing from their teaching practice and experience. This study supports the notion that student teachers lack confidence in enacting differentiation, despite being aware of its importance, when working with these students. We contend that teacher education needs to pay more attention to helping student teachers effectively differentiate to meet the needs of high-achieving students with higher learning potential.

Keywords:
Differentiation
High-achieving students
Students with higher learning potential
Practice-based teacher education
Preservice teacher education
Reflection
Secondary teacher education

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Introduction

Differentiation in education is a powerful concept, and we agree with critics who say that implementation is challenging. This study concerns student teachers and their understanding of differentiation for secondary school students with higher learning potential. Although most teachers, if asked, would indicate that they are committed to meeting students' individual needs, many teachers lack the knowledge to put this commitment into practice, and Tomlinson (2014) emphasized that some educators "even consider differentiated instruction a fundamental expectation for teachers in today's classrooms" (p. 2).

Although differentiation is essential for all learners, studies have shown that schools have inadequate knowledge about students with higher learning potential, and that instruction is differentiated only to a small extent to meet these students' needs and abilities (Norwegian Ministry of Education and Research [NMER], 2016). This situation may be explained by the fact that these students receive little attention in teacher education (Brevik & Gunnulfsen, 2016), and one could argue, more broadly in education in general.

Internationally, researchers have used more than 100 terms for these students that combine the words *giftedness*, *abilities*, *talent*, and *intelligence* (Bailey, Pearce, Winstanley, Smith, & Sutherland, 2008; Freeman, Raffan, & Warwick, 2010). It is problematic when researchers in the field of teacher education use different terms to describe the same phenomenon, and when they examine different phenomena, using the same concepts and terms (Jenset, 2017). We try to avoid the word "gifted"—or the G-word—especially when it is used as an entity (noun or object e.g., "he or she is gifted"), preferring to talk and write about *students with higher learning potential* and using the G-word as an adjective (e.g., he or she is a gifted [superior, advanced, innovative, exceptional, persuasive, compelling] writer for his or her age or compared with others her age; see also Renzulli, 2012). Although students with higher learning potential might include "gifted" students, underachieving able students, or students with dual or multiple exceptionalities (Wallace et al., 2009), they are not the focus in this study. The term *students with higher learning potential* constitutes a complex group of individuals with different needs comprising students who achieve at high levels and those who have potential to do so, a group estimated to constitute 10% to 15% of the school population (Gagné, 2005; Idsøe, 2014; Renzulli, 2005; Theilgaard & Raaschou, 2013).

Based on this definition, *students with higher learning potential* include a broad range of students. Research has shown that these students form a complex, heterogeneous group of

individuals with differing instruction and development needs, some with potential in one subject and others in several subjects or areas (NMER, 2016; Renzulli, 2012). Thus, it is easier to recognize students in this group who are identified based on cognitive tests than students with higher learning potential who might not be identified through such tests (Renzulli, 2012).

As differentiation for this student group is understudied in teacher education, and as our study aimed at exploring the views of student teachers who by definition have limited experience and practice with these students, we chose to delimit our focus. By focusing on the high achievers in this group, we aimed for more reliable responses from the student teachers. We define high-achieving students with higher learning potential as advanced students who achieve above-average grades, perform well in various assessment situations, *and* have higher learning potential. Although high-achieving students may perform at a high level, they might also have unfulfilled learning potential (Renzulli, 2012). Although low-achieving students might also have higher learning potential, they are not included in this study.

Based on the discussion above, and as differentiation is critically important in education, the present study aimed to identify student teachers' understanding of the use and value of differentiation for high-achieving students with higher learning potential.

Literature review

In 1997, Tomlinson et al. (1997) reported that student teachers from six universities in the United States found it difficult to implement differentiated teaching practice for low- and high-achieving students, even after receiving instruction and supervised training on campus. Sixteen years later, Cochran-Smith (2003) argued that the knowledge acquired during teacher education (TE) scarcely influences teachers' instructional practices. Specifically, when facing challenges in the classroom newly educated U.S. teachers often struggle to apply the knowledge from research-based TE programs (Cochran-Smith & Fries, 2005). Differentiated instruction is no exception (Santangelo & Tomlinson, 2012). Seminal studies from the United States have highlighted the importance of teaching student teachers about effective differentiation (Darling-Hammond, 2010; Grossman, 2005), especially as exercising differentiation in practice for low- and high-achieving students is challenging (Santangelo & Tomlinson, 2012; Tomlinson, 2014; Tomlinson et al., 1997). Some studies have shown that

consistent, enthusiastic differentiated teaching practice benefits a wide range of students (Stodolsky & Grossman, 2000; Tomlinson et al., 2008).

Studies have revealed that student teachers do not receive adequate training on what differentiated teaching practice means (Darling-Hammond, 2010; Grossman, 2005). Scholars argue that in addition to providing student teachers with theories about differentiation, teacher educators should offer practical training on campus under their guidance and help student teachers relate their knowledge to their teaching practices. This view seems to be supported in recent research on TE programs in Chile, Cuba, Finland, Norway, and the United States, which has shown that the strongest and most effective TE programs integrate theory and practice (Hammerness & Klette, 2015; Jenset, Klette, & Hammerness, 2017).

Thus, TE programs across the world should aid their student teachers to use differentiation in ways that increase and reflect student performance (Hodgson, Rønning, & Tomlinson, 2012; Santangelo & Tomlinson, 2012). This view is relevant, as research has indicated that novice and experienced teachers alike feel a need to cater primarily to the needs of low-achieving students who do not benefit from regular classroom instruction (NMER, 2016; Tomlinson, 2014).

Although differentiation is a goal, it is implemented inconsistently in the classroom (Santangelo & Tomlinson, 2012; Stodolsky & Grossman, 2000). For example, in the United States, Banks and colleagues. (2005) emphasized the teacher's importance in the design and implementation of differentiated instruction: "All teachers must be prepared to take into account the different experiences and academic needs of a wide range of students as they plan and teach" (p. 233). In another U.S. study, Hardre and Sullivan (2008, p. 2072) found that among 75 teachers in 19 secondary schools, the majority lacked strategies and knowledge to motivate students at different academic levels. It seems that many teachers do not have knowledge of how to implement differentiation and do not acknowledge the need for it.

For example, although teachers may use grades and test scores to get information about their students, such criteria might not identify some high-potential students because their strengths lie in areas not reflected by such measurements (Renzulli, 2012). In a study of national testing policies in Norwegian lower secondary schools, Gunnulfsen and Møller (2016) found that teachers use available test results primarily to confirm what the teachers already know about low-achieving students. The teachers do not use results to facilitate

differentiated teaching for high-achieving students based on their identified strengths or learning and development needs.

Norwegian studies have problematized the lack of differentiation in upper secondary classrooms as well. When students start upper secondary school, they can choose between general (academic) tracks, intended for students who want to continue in higher education, and vocational tracks, intended for students who want to learn a vocation and start working after secondary school. In a class in the general (academic) track, Blikstad-Balas (2012) studied students' laptop use during classroom instruction. She found that although some of the high-achieving students took school-related notes in every lesson, others spent their time on unrelated activities, such as reading online newspapers and playing games. During the observed lessons, the students did not receive differentiated instruction or comments on what they were doing. In a similar vein, Brevik (2017) found that students in the general (academic) track receive less differentiated instruction than students in the vocational track. Although the teachers in vocational classes challenged their students academically, based on their needs, the students in general classes were given tasks they quickly mastered without any problems. This result is interesting, as the general (academic) track in Norway has a higher share of high-achieving students than the vocational track (Brevik & Hellekjær, 2017; Brevik, Olsen, & Hellekjær, 2016).

The literature reviewed on teacher education and classroom practices around the world suggests that developing teachers' differentiation practice and experience is crucial. In line with this need, the present study aimed to elicit themes that are relevant for student teachers' understanding of differentiation for high-achieving students with higher learning potential. Two research questions guided the inquiry:

> RQ1: To what extent and how do student teachers identify and characterize high-achieving students with higher learning potential and their need for differentiated instruction?
>
> RQ2: How do they describe relevant themes concerning differentiated instruction for this group of students?

In line with Renzulli (2012) and Tomlinson (2014), we define differentiation as an attempt by the teacher to address the variation among learners in the classroom through multiple approaches that modify the instruction and curriculum to match students' individual

needs. It follows that learning is most effective when teachers can assess students' strengths and needs for development, and then use this information to help students progress to more advanced levels of understanding. However, differentiation is not the same as individualized learning for all students (Winstanley, 2016). Although such individualization is too much to expect from teachers, differentiation is achievable, particularly considering how differentiation is "central to personalized learning" (Winstanley, 2016, p. 317), but the two are not synonymous.

Theoretical framing

Acknowledging that several ways of defining differentiation exist (Gervis & Capel, 2016), we integrate Renzulli's (1977; Renzulli & Reis, 1997) and Tomlinson's (2014) theories of classroom differentiation for all types of learners with Renzulli's (2002, 2005, 2012) theory of differentiation for students with higher learning potential. These differentiation theories build on the teacher's enactment of dimensions of content, process, products, classroom management, and the teacher's commitment to differentiate. Tomlinson (2014) emphasizes the teacher's role in differentiation:

> In other words, teachers who differentiate provide specific alternatives for individuals to learn as deeply as possible and as quickly as possible, without assuming one student's road map for learning is identical to anyone else's. These teachers believe that students should be held to high standards. They work diligently to ensure that all students work harder than they meant to; achieve more than they thought they could; and come to believe that learning involves risk, error, and personal triumph. These teachers also work to ensure that all students consistently experience the reality that success stems from hard and informed work. (p. 2)

Content refers to the input students are expected to know and understand to reach a learning goal, including information from different sources (e.g., textbooks and web pages) that students should be familiar with (Tomlinson, 2014). Content differentiation involves adding depth to the curriculum by focusing on discipline-specific structures of knowledge, basic principles, functional concepts, and methods of inquiry (Renzulli, 1977). Creative Internet use can greatly enhance classroom differentiation strategies, thus expanding the learning environment far beyond the walls of the classroom and offering promise for engaging and differentiated content for students (Renzulli, 2012).

The *process* concerns procedures and practices students use to take in and make sense of the content. Often, the teacher shapes the process through activities during classroom instruction, which should be connected to learning goals and ensure that each student understands and creates his or her own ideas about the content (Tomlinson, 2014). Differentiating process incorporates the use of instructional strategies and materials to enhance and motivate students based on their learning profiles (Renzulli, 1977).

The *product* focuses on how students show what they can do, understand, and have learned about the content. However, the product is not everything a student produces during a lesson; for example, responses to questions linked to a text are not considered part of the product. Instead, the product refers to culminating or summative products like texts, tests, presentations, and projects (Tomlinson, 2014). Product differentiation enhances students' communication skills by encouraging them to express themselves in various ways (Renzulli, 1977).

The *environment* covers social interactions, climate, tone, and conditions in a classroom, understood as the teacher's management of student behavior in a way that facilitates learning, such as by changing students' seating or using assistant teachers to enhance the learning environment (Tomlinson, 2014). To differentiate the environment, teachers can change the physical environment and grouping patterns in the classroom and vary the time and resource allocations for groups and individuals (Renzulli, 1977).

Finally, *teachers* can differentiate themselves by modeling the roles of athletic or drama coaches, stage or production managers, promotional agents, and academic advisers. All these roles differ qualitatively from the role of teacher-as-instructor (Renzulli, 1977). Santangelo and Tomlinson (2012) noted that teachers must have high expectations and facilitate student learning, while designing a good learning environment to meet individual students' needs for approval, participation, and challenges.

Although these theories relate to all types of learners, Renzulli (2002, 2012) developed the theory of *Three-Ring Conception of Giftedness*, describing how we can develop high potential in students. Although the present study does not focus on gifted students, this theory is relevant because students who perform at advanced levels, regardless of how we refer to or label them, are prime candidates for such differentiation. Although they might demonstrate giftedness (in terms of behavior), the theory enables us to recognize relevant traits or areas for differentiation. In this theory, Renzulli (2002, 2012) described three clusters of traits, which

emerge in various combinations in certain students, at certain times, and under certain circumstances: (a) above-average ability, (b) task commitment, and (c) creativity. Renzulli (2012) argues that the educational context—including differentiated instruction—creates the conditions for stimulating overlap and interaction between and among these traits.

Above-average ability refers to high levels of abstract thought, adaptability to new situations, and the "ability" to apply general abilities to specific areas, retrieve information quickly and accurately, distinguish relevant from irrelevant information, and troubleshoot while pursuing a problem using advanced strategies. Thus, it relates to intelligence and is therefore minimally affected by teaching (Renzulli, 2002, 2012). *Task commitment* is linked to motivation (e.g., perseverance and determination), suggesting traits can be developed. Typically, high-potential students exhibiting task commitment immerse themselves in a problem for an extended period and persevere even when encountering obstacles that would inhibit others (Renzulli, 2002, 2012). *Creativity* refers to traits such as curiosity, originality, ingenuity, and a willingness to challenge conventions and tradition. Such traits make high-potential students willing to take risks and solve problems in original ways (Renzulli, 2002, 2012).

Although these qualities are not mutually exclusive, the distinction is useful to identify these students' strengths and respond to their development needs. Although academic abilities remain relatively constant over time, task commitment and creativity are contextual, situational, and temporal and therefore can be developed (Renzulli, 2002, 2012). Thus, this importance of social, emotional (e.g., interest, motivation), and cognitive competences should therefore be emphasized (Renzulli, 2002, 2012; Tomlinson 2014). Tomlinson (2014) argued that differentiation contributes to students' growth, motivation, and efficiency, which is highly relevant for this study.

The case context

Over the past two decades, Norway, like many countries, has emphasized differentiated instruction (NMER, 1998, 2008, 2009, 2014, 2015) and recently included attention for high-potential students (NMER, 2016). Students are obligated to attend primary (grades 1–7) and lower secondary education (grades 8–10), with a subsequent right to three years' upper secondary education and training (grades 11–13). The educational reform, *The Knowledge*

Promotion (NMER, 2013), defines learning outcome for grades 1–13, whereas The Education Act (NMER, 1998, §1–3) states that differentiated instruction shall be ensured for all students.

However, reform evaluations (e.g., Hodgson et al., 2012) have revealed potential incompatibilities between teachers' required focus on differentiation for all students (the social dimension), while enhancing each student's learning outcomes (the academic dimension). Recent white papers addressed this dual challenge of differentiation (NMER, 2014, 2015, 2016), noting the relation between students' academic, social, and emotional competencies. Consistent with this study's theoretical framing, these papers have emphasized the importance of creating a safe, collaborative learning environment. This educational attention makes it even more important to prepare new teachers for the differentiation demands for high-achieving students with higher learning potential in contemporary education (NMER, 2016). This issue arguably is relevant not only in Norway, but for teacher education across the world.

White papers require TE programs to include professional teaching competence, focusing on differentiation (NMER, 2002, 2009). To qualify to teach in secondary school, students apply to TE or master of education (ME) programs. The ME program lasts for five years, including practice and professional teaching courses, with student teachers writing a master's thesis. The other way of entering teaching is through a separate TE program, which is classified as a diploma, comprising practice and professional teaching courses. The TE programs can be taken full-time (one year) or part-time, with an undergraduate degree needed first.

The present study was conducted at the University of Oslo, a large Norwegian public university, which offers ME and TE programs[1]. The majority of students entering the TE programs has completed their master's degree; some of these have worked as teachers without formal TE and attend the program to obtain certification to teach. Thus, student teachers in the TE and ME programs are of varying ages with varying teaching experiences. In the course descriptions; differentiated instruction in accordance with the Education Act (NMER, 1998) is emphasized.

[1] The ME program is structured in a two-term model, with a normal progression rate of 30 credits each term, in which students choose two school subjects (180 + 60 credits), specializing in one by writing a master thesis. In addition, they take a total of 60 credits of professional teaching courses across the sixth and seventh terms. The sixth term is the final term on the undergraduate (bachelor's) level, while the seventh term is the first term on the graduate (master's) level. The TE programs comprise professional teaching courses over 12 months (full-time) or 18 months (part-time).

Methods

We designed this study as a qualitative exploratory approach; building on naturalistic case study methodology (Creswell & Poth, 2018; Stake, 1995; Yin, 2017), although case studies are far from only an exploratory method. This is important, as the case of student teachers' experiences and practices for differentiated instruction for high-achieving students with higher learning potential is understudied (Freeman et al., 2010; NMER, 2016).

Purposeful sampling

In line with qualitative sampling strategies, we used purposeful selection at the process, participant, and site level (Creswell & Poth, 2018). As the main rationale for selecting the case is the lack of information about these differentiation processes; this is an instrumental case study to better understand the issue (Stake, 1995). We sought participants studying to become teachers in secondary school (grades 8–13), preferably from ME and TE programs to capture the maximum variation in individuals on characteristics such as age, gender, teaching experience, and educational background (Creswell & Poth, 2018; Johnson & Christensen, 2014; Miles & Huberman, 1994). As only a handful of institutions offer all three ME and TE programs for grades 8–13 in Norway, and as the student teachers at the university in which two of the authors work fulfill the required characteristics, we chose this as the research site. Although this sample might resemble a convenience sample, it comprises a maximum variation sample in this context. Table 1 presents an overview of participant characteristics.

Table 1. Participants.

Term	Program	Student teachers
2013 Spring	TE full-time	50
2013 Autumn	ME	52
2014 Spring	TE full-time	98
2014 Autumn	ME	37
2015 Spring	TE part-time	85
Total		322

Note. TE = Teacher Education, ME = Master of Education.

To gather enough information, saturation strategies made us include five cohorts in 2013–2015 (N = 322, see Table 1). Participants were seniors in the five-year ME program (autumn 2013 and 2014), the one-year full-time TE program (spring 2013 and 2014), and the 18-month part-time TE program (spring 2015). Given the structure of these programs, all participants had finished their 12-week practice immediately before we collected data. Following the general rule in qualitative sampling, we attempted to use a sample size that was large enough to obtain saturation, "(i.e., where no new or relevant information seems to emerge as more data are collected) but small enough to conduct a deep, case-oriented analysis" (Johnson & Christensen, 2014, p. 273). Thus, we continued interviewing until the new information obtained did not provide further insights across the cohorts (2013–2015). Considering each cohort as a separate case offered the opportunity to conduct within- and cross-case analyses to get important comparative information; we designed a collective within-site case study, which explores the complex phenomenon of differentiation for the students in question, as real-life, contemporary bounded systems over time (Creswell & Poth, 2018; Johnson & Christensen, 2014; Yin, 2014).

Data collection

Although case study research commonly involves multiple sources of information, the number of sources must be balanced with how much depth is possible in multiple case studies (Creswell & Poth, 2018; Stake, 1995). We relied on one main data source (group interviews) and three supplementary data sources (documents, mind maps, and audio recordings). Employing rigorous data collection procedures, we used replication logic and collected the same data in the same manner across cases (Yin, 2014).

Documents

We analyzed documents for case information. Public documents comprised the Education Act (NMER, 1998), the national curriculum and evaluations thereof (Hodgson et al., 2012; NMER, 2013), reports and white papers about differentiation in secondary schools (NMER, 2008, 2009, 2014, 2015, 2016) and teacher education (NMER, 2002, 2009). Organizational documents comprised outcome descriptions in the TE and ME programs at the case university.

Group interviews

This study was informed predominantly by group interviews to initiate interaction between participants (Creswell & Poth, 2018). As this is an understudied topic, we wanted to include the voices of a large number of participants. We divided each cohort into groups of three to five participants, resulting in 10–20 focus groups for each cohort. We conducted a systematic evaluation of the sample size to create effective groups (McLafferty, 2004), and forming groups was part of differentiating the student teacher interaction. Collection occurred at the beginning of a lecture concerning differentiated instruction and lasted for 45–60 minutes for each cohort.

In line with Dennen (2005), through the in situ nature of the case study design, natural participant interactions unfolded. For each prompt, we followed the same procedure: First, the participants reflected individually for two minutes and took notes. Then, each focus group talked for five minutes before sharing their opinions with the cohort. As the aim was not to elicit individual responses but to identify themes of shared practices and experiences, this data collection instrument was appropriate to the research design and in line with our understanding of teacher learning as a process in which participants "interact with peers, instructors, cooperating teachers, students, [and] integrate past learning and prior experiences to inform their understanding" (Bale, 2016, p. 395).

We asked each focus group to respond to the following prompts: (a) "To what extent are you able to identify high-achieving students with higher learning potential in the classes you have recently taught in your teaching practice?" (b) "How would you characterize these students in terms of strengths and needs?" (c) "When do you believe these students performed at their best; before, during, or after a classroom activity?" (d) "How would you describe their needs for a safe classroom and learning environment?" (e) "How could you enact differentiated instruction to respond to these students' strengths and needs?" We based the questions on the theoretical framing presented above (Renzulli, 1977, 2002, 2005, 2012; Tomlinson, 2014).

Mind maps

During the sessions, Brevik facilitated the focus groups' responses, while Gunnulfsen noted the responses as keywords in mind maps on the board. The groups responded in turn, and everyone who wanted to speak had the opportunity. We prompted the next question only when no one had anything to add after 10 seconds of silence. By writing the keywords, we visualized the within-case responses. Thus, the mind maps functioned as instant member checking to ensure that we captured relevant information in writing and validated the accuracy of our interpretation (Creswell & Poth, 2018). Although the mind maps were produced during the interviews, we consider them supplementary data sources due to their visual nature and the systematic mapping of ideas.

Audio recordings

We audio-recorded and transcribed the sessions. The recordings captured the sound of the participants and details in their explanations, to form a rich picture of their experiences (Creswell & Poth, 2018).

Data analysis

We used four strategies for data analysis: (a) document analysis, (b) thematic analysis of the mind maps, (c) word cloud generation, and (d) thematic analysis of interviews and transcriptions. The data analysis proceeded iteratively, consistent with qualitative case study research (Stake, 1995), and content analysis of the transcripts for the five cases (Stemler, 2015). We used Microsoft Excel for thematic analysis. Authors 1 and 2 typed the keywords from the mind maps into rows organized by cohort. In the second and third columns, we generated data-driven themes (inductively) and identified theoretical themes (deductively; e.g., see Table 2).

Table 2. Example of thematic analysis of the responses across cases to the question, "How would you describe their needs for a safe classroom and learning environment?"

Case	Key words (from mind maps)	Data-driven themes (inductive)	Theoretical themes (deductive)
2013 Spring (TE)	culture for being clever	acceptance (b)	a. good learning environment (3)
	no pressure to be high-achieving	acceptance (b)	b. social/emotional needs (6)
	known activities	predictability (a)	c. good climate (1)
	predictability	predictability (a)	
	encouraging reflection	reflection (a)	
	acceptance for being clever	acceptance (b)	
	handle insecurity	mastery (b)	
	not made an example of	acceptance (b)	
	good relations to teachers and peers	relations (b)	
	allowed to ask questions	climate (c)	
2013 Autumn (ME)	good learning situations	environment (a)	a. good learning environment (2)
	predictability	predictability (a)	b. social/emotional needs (2)
	to be seen (attention)	attention (b)	
	feeling of belonging	relations (b)	
2014 Spring (TE)	competent teacher	environment (a)	a. good learning environment (3)
	intellectual challenges	challenges (a)	b. social/emotional needs (4)
	good groups	environment (a)	c. good climate (1)
	not being co-teacher	acceptance (b)	
	acceptance for being clever	acceptance (b)	
	teacher honesty	relations (b)	
	to be seen	attention (b)	
	good climate	climate (c)	
2014 Autumn (ME)	predictability	predictability (a)	a. good learning environment (2)
	good academic achievements	challenges (a)	b. social/emotional needs (4)
	acceptance for being clever	acceptance (b)	c. good climate (1)
	supportive parents	parents (b)	
	to be seen by teacher	attention (b)	
	teacher recognition	attention (b)	
	good climate	climate (c)	
2015 Spring (TE)	culture for being clever	environment (a)	a. good learning environment (5)
	silence	environment (a)	b. social/emotional needs (5)
	feedback to support learning	feedback (a)	c. good climate (3)
	behavior management	control (a)	
	encouraging reflection	reflection (a)	
	individual work	relations (b)	
	acceptance for being clever	acceptance (b)	
	good home environment	parents (b)	
	being taken seriously	acceptance (b)	
	to be seen and heard	acceptance (b)	
	honesty and openness	openness (c)	
	good class environment	climate (c)	
	good school environment	climate (c)	

Then, we generated word clouds based on the themes, and compared the frequency within and cross-case (e.g., see Figure 1).

Fig. 1. Example of a word cloud generated from the thematic analysis of the learning environment in Table 2.

We looked across the cases to identify similar concepts or themes. After transcribing the group sessions, we used abduction (Alvesson & Sköldberg, 2009) by going back and forth between the data and the theory, to mine the transcriptions for themes based on Tomlinson's (2014) and Renzulli's (2012) categories, and compared them to the word clouds. This step let us test the identified themes to verify, refine, or refute them based on the transcriptions and the theory (Creswell & Poth, 2018). We repeated this process to refine the themes into three patterns.

Validity, reliability, ethics, and limitations

The study was approved by the Norwegian Centre for Research Data. We informed the participants that participation was voluntary and anonymous (Brevik, 2013; Busher & James, 2012). We used several strategies to validate the accuracy of the account (Creswell & Poth, 2018). TE researchers rely on self-reports and single-case studies, which indicates the need to enhance the validity of research (Cochran-Smith et al., 2010). Although this might be difficult to achieve in a small-scale study, we addressed this threat to validity by corroborating evidence through the use of *triangulation*, that is, multiple procedures to shed light on the themes (Miles & Huberman, 1994; Yin, 2017), combining multiple cases and sources, two theoretical perspectives, member-checking, and external audit.

We used *triangulation* within each case, and systematic cross-case checking of information and conclusions. In autumn 2015, we also conducted a digital survey in a sixth cohort (N = 35); participants accessed the survey via a link to a digital questionnaire using their mobile phones. Similar to the original data collection, this collection occurred during the first part of a lecture about differentiation. The questions were identical to the prompts in the five cases, with the assumption of more detailed descriptions using own words. Survey results from individual participants showed great overlap with the findings from the five cohorts, suggesting reliable answers from the original data collection, and confirming saturation (Johnson & Christensen, 2014). We also noted the resemblance between the identified themes and the theory using Tomlinson's (2014) and Renzulli's (1977, 2002, 2005, 2012) theories to strengthen the internal validity.

Using *member checking* (Miles & Huberman, 1994), we sought participant feedback on the credibility of our interpretations of the mind maps and to make sure the key words represented their language (Stake, 1995). The transcriptions confirmed that the participants built on each other's statements, agreeing as well as disagreeing. Student Teacher 2-1 offered an example of this building practice: "Well, I just thought, now that almost everything we've talked about has come up, one thing I have been thinking about..." Some bias may have been introduced by opinion leaders in the large group discussions, which may have pressured some participants to provide socially preferable answers. We hope that concern was offset when participants heard others' reports, legitimate perspectives occurred to them that they might not have remembered on their own (Kvale & Brinkmann, 2009). The *participant's lens* was strengthened by collecting data from different programs, which allowed us to study emerging

themes through *prolonged engagement* across five semesters (Creswell & Poth, 2018). However, as all participants were enrolled in programs that certify for secondary education, the results may not be valid for primary school contexts. The decision to exclude low-achieving students with higher learning potential might be considered a limitation. The decision was made because low-achieving students in general receive more attention than high-achieving students in Norway. We enabled an *external audit* by presenting our research to the members of our research group, who had no connection to the study. These auditors comprise researchers who use various research methods and were specifically asked to examine the rigor of the methodology (Creswell & Poth, 2018).

We addressed reliability by transcribing the recordings to indicate pauses and overlaps, and by *intercoder agreement*. Establishing a common platform for coding, Authors 1 and 2 analyzed all the data, first separately and then together, to ensure a common understanding, with Renzulli validating the interpretations (see Figure 1 and Table 2). Based on these considerations, we find the data trustworthy and justified in making valid and reasonable interpretations of the material (Creswell & Poth, 2018).

Findings

The student teachers across the five cases provide insight into their practices and experiences with differentiated instruction for high-achieving students with higher learning potential. Differentiation includes the use of multiple approaches that modify instruction (Renzulli, 2012; Tomlinson, 2014; Winstanley, 2016), and studying more than 300 student teachers requires attention to similarities and differences of opinion. Their experiences illustrate the challenges involved and portray how the findings might be generalized to other cases. The first section involves the establishing phase of the need for differentiation, and the following sections each represent one of the three identified patterns that cut across the cases: challenges in 1) creating safe learning environments, 2) identifying student differences, and 3) enacting differentiated instruction.

Establishing the need for differentiation

When the student teachers reflected on their practice, they acknowledged the need for differentiation for high-achieving students with higher learning potential and regarded it as their professional responsibility to do so. The TE programs (cases 1, 3, 5) comprise the

majority of student teachers who had already finished their disciplinary master's degree and had teaching experience in addition to the TE programs, particularly those attending the part-time program (case 5). The ME programs (cases 2, 4) comprise younger student teachers at the master's level. They had limited teaching experience except for the practice in the program. The main challenge across cases is balancing the social and academic dimensions, as expressed by one of the participants (case 4):

> *Student teacher C4-1*: These are often students that are confident, but don't have a positive self-image, so affirming them and reassuring them [is important]. And if they're always self-regulated or managing their own time well, they may be overlooked and the like, so it's important to pay attention to them.

Such statements communicate the importance of identifying these students, and acknowledging the complex nature of their characteristics. Based on what emerged during the interviews, all cases reflected on challenges: getting to know the students to design differentiation. The views across cases in terms of the social and academic dimensions of differentiation are illustrated in the following sections.

Challenges in creating safe learning environments

Although the issue of a safe learning environment was perhaps influenced by the nature of the questioning, as the phrase is included in one of the prompts, this assertion was addressed repeatedly in all cases (see Table 2). They argued the urgency for these students to be acknowledged and accepted (see Figure 1), not to be made an example of or made fun of, and the importance of creating an environment in which it was acceptable to be high-achieving to fulfill their higher learning potential. Student teachers across the cases viewed this conception of acceptance as a baseline of the classroom climate or tone to enhance good learning processes for these students.

Although the ME programs (cases 2, 4) juxtaposed the social and academic challenges and found both to be equally important, the TE programs (cases 1, 3, 5) aligned the two by seeing the social dimension as a prerequisite before attending to the academic dimension. The TE programs offered nuanced views on the issue based on their experiences and emphasized the challenges of creating such environments despite good intentions. They believed a

competent teacher should give these students confidence, where being high-achieving was not only accepted but where they would not be bullied or made fun of, and that everyone is "seen" by their teacher.

In addition, the TE part-time program (case 5) was particularly concerned about what they described as the students' preference for individual work over collaboration. They believed this preference represents a troubling paradox in that a lack of collaboration would be a lost opportunity for the students to be shaped by the social practices they inhabited, and shaping them, which might contribute negatively to the learning environment. According to the student teachers, the need for a safe learning environment was important to all these students, although they acknowledged that these students were diverse.

Challenges in identifying student differences

The second pattern across cases was the student teachers' assertion that despite obvious similarities, there were clear differences among the high-achieving students with higher learning potential. Across cases, the student teachers characterized these students first as a heterogeneous group with various academic, cognitive, social, and emotional strengths and needs. Some were described as quiet, while others appeared social and talkative, and the student teachers acknowledged that some high-potential students might not be identified at all. Within the TE part-time program (case 5), the participants discussed the belief that these students represented a complex group of learners who could not be pinned down easily:

> *Student teacher C5-1*: At least to me, high-achieving children are rather those who are conscientious, who do as they are told, who pay attention, who are interested, well whatever…
>
> *Student teacher C5*-2: They are bored.
>
> *Student teacher C5*-3: Versatile. At least if we talk about the high-achieving ones, not the gifted, but the high-achieving ones, well, they are versatile.
>
> *Student teacher C5-4:* I think that this characterization is an impossible task because I believe they appear in different shapes. They can be silent and sociable, and they can be ... appear to be interested in challenges, or not interested at all [...] and we cannot necessarily just put them in one box.

Although this interaction underscores the need for attention to within-group differences among the high-potential students, it also questions the seeming consensus among the student teachers within and across cases, which indicates that identifying these students might be somewhat more problematic than initially suggested. Although each case found these students' general strengths lie in the academic dimension, specifically their above-average abilities and task commitment, not all of these students seemed to be characterized by the same academic abilities or the same degree of task commitment.

Above-average ability

Across cases, the student teachers referred to these students as reflective, self-regulated, and independent in their learning. For example, the students they had taught seemed conscientious about their own learning and employed individual learning strategies when these were suggested.

Although none of the participants had used test results to identify the students' abilities, there were differences of opinion in terms of the students' levels of abstraction while pursuing a problem. The ME program participants (cases 2, 4) referred to these students' ability to move from concrete learning situations in the classroom to abstract understanding and apply that understanding to new situations. In contrast, several participants in the TE programs (cases 1, 3, 5) argued that they had never observed these students in situations where such transfer of knowledge had occurred. Even so, student teachers across cases mentioned these students' interest in disciplinary challenges and their abilities to identify disciplinary connections and challenges, as expressed below:

> *Student teacher C2-1:* Well, I just thought, now that almost everything we've talked about has come up, one thing I have been thinking about: these students identify connections. Like in history, they somehow manage to see one conflict and its links to another conflict. This is often what separates them, I think, a high-potential student and an average student.

Despite the differences in abstract thought and adaptability to new situations, the participants clearly agreed that the students were preoccupied with good grades and workloads.

Task commitment

According to the student teachers, this link between good grades and a willingness to work hard is a characteristic of these students. Across cases, however, the participants identified students who primarily were characterized by their perseverance and determination with school work, who were not necessarily concerned with grades. They were described as hardworking and always did the tasks they were assigned. These students' participation in own learning and development was prominent, such as being motivated, targeted, and focused on a task for an extended period, and having the willpower to do so even when facing problems. Student teachers in one of the TE programs (case 5) revealed that these students always finished their presentations, assignments, and tests on time, once again indicating their task commitment and their ability to make and finish the requested product. Although there was a general notion across cases that these students were proficient in all activities, their ability to prepare well was seen as a strength, in addition to their use of teacher feedback to improve own work during and after an assignment when they received teachers' written feedback.

However, the student teachers found individual students were characterized by only a few of these traits. This variability was particularly evident when the student teachers addressed the students' determination. One TE program (case 3) argued that some of these students had poor working habits because they understood tasks too quickly and had never learned how to struggle with problem-solving, and participants in both ME programs (cases 2, 4) stated that these students should learn to work even harder, be even more time efficient, and use the teacher's feedback to an even greater extent.

Creativity

The student teachers found some students "think outside the box" and master tasks that require in-depth learning and problem-solving. Although the student teachers found these students to be quizzical and curious, this trait was considered less prominent than academic abilities and task commitment. Participants in two TE programs (cases 3, 5) observed creativity as a characteristic, suggesting consideration of whether creativity actually is more rare, or whether it tells us something about the way in which the able students are being identified. In addition, these students were characterized as challenging, and seemed to

challenge the student teachers' knowledge, instead of using their curiosity to show originality of thought or take risks.

Challenges in enacting differentiated instruction

Across the cases, the student teachers' biggest concern was determining how to respond to these students' needs for development in terms of differentiated instruction. The findings among the 322 student teachers suggested that although they seemed confident about "who" the high-potential students were, "what" their traits and needs might be, and "why" they should plan and enact differentiated instruction for these students, they were uncertain about the "how." Although they felt confident in their knowledge of how to identify this group of students, the responses illustrate a range of understanding, from basic to reasonably well informed, as well as evidence of misconceptions.

For example, while some student teachers in the TE programs claimed that these students needed to focus on details (case 1), others emphasized the need for general knowledge (cases 3, 5), and some saw these skills as complementary that the high-achieving students with higher learning potential would benefit from developing (cases 1, 3), depending on whether they were interested in challenges. Although the participants found these students to have high unmet potential in the areas that they mastered well, whether related to above-average ability, task commitment, or creativity, and although they indicated that there were lost opportunities for development because students primarily did what they were asked, they found it challenging to know how to address these issues. For example, the following utterances acknowledge the potential of developing creativity but offer few suggestions in terms of differentiation:

> *Student teacher 3-6:* Some of these students think outside the box […], but there are probably many who don't, so practicing creativity, I think, is good for many of them.

> *Student teacher 2-2:* Well, it is very good to give the opportunity to use creative expressions, but I think that for some high-achieving students it rather helps to relate this to subject-specific tasks, like abstract thinking, to give them the opportunity to do things differently than the others in class.

> *Student teacher 4-2:* That's what I was going to say…for example, point to sources that can be creative, whether it is films or museums or travel destinations; well, you name it.

Student teachers across cases found it challenging to enact differentiation for these students but suggested that they needed to exercise ambitions on their behalf, by providing intellectually challenging tasks (product differentiation). On one hand, they emphasized the importance of recognizing the students' strengths, specifically as some were described as underachievers. The student teachers found some of these high-achieving students worked less than usual if they were not motivated to make an effort and indicated they needed to work harder or differently (process differentiation). On the other hand, they argued that it might be profitable to understand how to help these students develop in areas they did not master (e.g., learning to accept that they did not always need to be the best). Of note, no student teacher referred to content adjustments for these students (content differentiation).

Summary

The findings provide illustrations of practices with differentiated instruction for high-achieving students with higher learning potential. Although the student teachers from the TE and ME programs agreed that differentiated instruction for these students matters, and despite their varying teaching experiences, they had very limited practice in enacting such differentiation. The detailed examples of how student teachers within and across the cases expressed concerns emphasize the complex nature of the identification of students and differentiation to address their needs.

Discussion

The results illustrate student teachers' everyday practices and intentions to differentiate their instruction. They seemed aware of their dual roles as future teachers and learners in terms of how to differentiate their instruction, and their responses indicated their commitment to meeting these students' needs. The way the student teachers expressed this awareness suggests they understand the value of differentiation for this student group, although they found it challenging to do so. Although we draw on student teachers' practices,

we do not aim to provide evidence that they lack confidence in enacting differentiation for these students but to inform professionals of such challenges in teacher education.

Environment differentiation?

Based on Renzulli (1977) and Tomlinson (2014), teachers might differentiate their instruction to create a good tone or climate in the classroom, which the student teachers emphasized. Interestingly, although the student teachers agreed on the importance of the learning environment, their responses differed across cases. The ME programs, with less teaching experience, emphasized both the social and academic dimensions, while the TE programs, with more teaching experience, mainly attended to the social dimension. The need to balance these dimensions is in line with Santangelo and Tomlinson (2012), who noted that teachers must have high expectations and facilitate academic student learning, while at the same time design a good environment to meet students' needs for approval, participation, and challenges.

The cross-case consensus of the environment raises the question of whether attending to the classroom climate is a basic need that should be addressed before differentiating the academic dimensions of process, product, or content for these students. Here, the five cases help to illustrate the challenging relationship between the social and academic dimensions of differentiated instruction. Analyzing teachers' differentiation across English classrooms in Norwegian secondary schools, Solberg (2017) revealed similar findings, showing that (a) there was little differentiation in the observed classrooms, and (b) where differentiation was identified, the environment was differentiated for low-achieving students only, while the learning process was differentiated for low- and high-achieving students. Admittedly, the low-achieving students in the Solberg (2017) study might have had higher learning potential, although this was neither identified nor a focus in her study. This challenge is in line with Tomlinson's (2014) framing of the teacher as the director of the classroom environment in which the social interactions facilitate positive learning conditions.

However, educational evaluations have revealed potential incompatibilities between the social and academic dimensions (Hodgson et al., 2012), a dual challenge of differentiation that has been addressed in educational documents emphasizing the importance of creating a safe, collaborative learning environment (NMER, 2014, 2015, 2016). This attention makes it important to prepare new teachers for the differentiation demands for high-achieving students

with higher learning potential in contemporary education (Renzulli, 2012; NMER, 2016; Winstanley, 2016). Either way, if student teachers find the notion of enacting such differentiation challenging, then teacher education needs to address this issue (Brevik & Gunnulfsen, 2016; Darling-Hammond, 2010; Grossman, 2005). Given student teachers' lack of experience, teacher education has much to offer to create a safe learning environment for these students.

Of relevance is whether the student teachers' emphasis on the environment is about differentiation in line with Renzulli (2002, 2012) and Tomlinson (2014), or instead a general statement about the importance of creating a good learning environment as a baseline, before differentiation for high-achieving students with higher learning potential can be enacted.

Identifying student differences?

A key finding of this study is the need for attention to within-group differences among these students. Based on this finding, it is surprising that the student teachers expressed that they found the identification of these students unproblematic, particularly as they found planning and enacting differentiation for these students challenging. It is not enough for new teachers to rely on grades and test scores to get information about these students; such criteria might not identify some students because their strengths lie in other areas (Renzulli, 2002, 2012), and available test results primarily are utilized to identify low-achieving students (Gunnulfsen & Møller, 2016).

For the student teachers, the prominent academic strengths of these students might overshadow the complexity of their needs. It might be relevant for teacher educators to focus on identifying traits such as curiosity, originality, ingenuity, and a willingness to challenge conventions (Renzulli, 2002, 2012) to meet the need for development among these students.

Researchers have argued that even after receiving supervised training in differentiation, student teachers find it challenging to attend to student differences (Cochran-Smith, 2003; Cochran-Smith & Fries, 2005; Santangelo & Tomlinson, 2012). If differentiation is to be integral to effective instruction (Darling-Hammond, 2010; Grossman, 2005; Stodolsky & Grossman, 2000; Tomlinson et al., 2008), then student teachers' lack of confidence in attending to such differences must be addressed. Although we agree with Banks and colleagues (2005), who emphasize that all teachers should be prepared to take into account the different experiences and academic needs of a wide range of students, we contend

that teacher education needs to pay more attention to helping student teachers effectively differentiate to meet the needs of the students. As Darling-Hammond (2010) has argued, scaffolding provided by teacher educators can be crucial for developing differentiation competence in future teachers.

Enacting differentiated instruction?

The notion that the student teachers lack confidence in enacting differentiation, despite being aware of its importance, when working with these students was based on our analysis across the cases. Although the student teachers' reflections were almost unanimously related to the importance of having ambitions on behalf of these students, *as well as* offering approval and a safe learning environment in terms of predictability, confidence, and approval, they struggled with seeing how to enact such differentiation. These findings are in line with previous studies of U.S. teachers who lacked strategies and knowledge to differentiate their practices and motivate students at different academic levels (Hardre & Sullivan, 2008; Tomlinson et al., 1997).

In line with Renzulli's (2002, 2012) argument that task commitment and creativity are situational traits that can be developed, it is difficult to see how students might develop these traits unless they experience challenging learning situations. This notion supports studies of high-achieving students who were not challenged academically in the classroom (Blikstad-Balas, 2012; Brevik, 2017) and the reported lack of differentiation for students who were high-achievers in English reading but low-achievers in Norwegian reading (Brevik, 2016). This paradox suggests that when planning differentiated instruction for these students, teachers must balance their strengths with the unmet potential. This balance might involve identifying the needs of these students *beyond* what Banks et al. (2005) defined as academic needs and directly focusing on the different experiences these students have or do not have.

In addition, differentiated instruction may advantageously emphasize Tomlinson's (2014) third dimension, where attention is paid to students' readiness, interests, and learning profile to contribute to increased motivation and effectiveness in the learning process. Such a focus on students' interests is especially relevant considering previous studies that have highlighted teachers' need to address students' interests in and out of school (Brevik, 2016, 2017). Although some students learn more effectively by doing projects, others learn best by

discussion, simulations, computer-assisted instruction, or finding just-in-time Internet information and resources for a project they are pursuing.

There should be little doubt that students have preferences for the ways in which they like to express themselves: orally, visually, graphically, dramatically, or through construction, digital media, or various written genres. In basic skill areas, a nearly unlimited amount of material covers math and reading/language arts concepts at various levels. These materials can easily be directed to individuals or small achievement-level groups electronically by letting the computer do the heavy lifting, making the very valuable concept of differentiation a workable reality. Many of the resources available from the Internet incorporate opportunities for addressing the kinds of student differences mentioned above, and they extend differentiation beyond mere content modifications.

High-achieving students with higher learning potential have opportunities to engage in challenging problem-based enrichment projects that extend their thinking skills and creative productivity far beyond what is typically covered in the curriculum. Education is usually slower than other professions to adapt to changes in technology. Amazon and Netflix know our preferences and send us only selections in which they know we have an interest. However, we need to help student teachers figure out how to make differentiation work. Using technology is one approach that will enable them to access the almost unlimited resources that may improve achievement and make learning the enjoyable, engaging, and exciting process that it should be.

Implications and future research

An avenue for further research could be to observe such differentiation enacted by student teachers during their practices, for example, using video recording in classrooms combined with interviews with high-achieving students with higher learning potential. Research on the gains and losses of data collection in group sessions, as in the present study, compared to individual interviews to gain access to individual voices, is also of interest. As a follow-up of qualitative studies of student teachers' experiences and practices, it would be relevant to design a quantitative study to measure identified variables. Including low-achieving students with high learning potential might be of interest in future studies. There definitely seems to be a space for student voices to be heard and to be more integrated with

the teacher-led activities in the differentiated classroom. Such studies might provide new insight into this phenomenon.

Conclusion

This article has illustrated how student teachers' practice and experience with high-achieving students with higher learning potential can contribute to new insights about differentiated instruction. This study provides valuable insight into student teachers' views concerning their own competence. Examples presented show that they express uncertainty regarding how to respond to these students' needs. This insight offers a unique opportunity for teacher education to provide useful information, examples, and situations to plan and practice differentiation. Because student teachers are often concerned about what they feel they cannot do (i.e., how to respond to these students' needs in terms of differentiated teaching), the insight from this case study reflects the need to develop and reaffirm their abilities, as they cannot be released from the duty to differentiate for these students. Teacher education, schools, and teachers have a shared responsibility for ensuring that these students receive good differentiated instruction. We do not expect the complex teaching of these students to be all about differentiation, and it would be equally unreasonable to expect student teachers to provide ample differentiation opportunities in every lesson. Still, given these findings, it is tempting to say that student teachers should be given the opportunity to identify students and needs, and plan and enact differentiated instruction for high-achieving students with higher learning potential more often.

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References

Alvesson, M., & Sköldberg, K. (2009). *Reflexive methodology: New vistas for qualitative research* (2nd ed.). London, England: Sage.

Bailey, R., Pearce, G., Winstanley, C., Smith, C., & Sutherland, M. (2008). *A systematic review of interventions aimed at improving the educational achievement of students identified as gifted and talented*. London, England: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Bale, J. (2016). Language proficiency in an era of accountability: Using the target language to learn how to teach. *Journal of Teacher Education*, *67*(5), 392–407.

Banks, J., Cochran-Smith, M., Moll, L., Richert, A., Zeichner, K., & LePage, P. (2005). Teaching diverse learners. In L. Darling-Hammond & J. Bransford (Eds.), *Preparing teachers for a changing world: What teachers should learn and be able to do* (pp. 232–274). San Francisco, CA: Jossey-Bass.

Blikstad-Balas, M. (2012). Digital literacy in upper secondary school—What are students using their laptops for during teacher instruction? *Nordic Journal of Digital Literacy*, *7*(2), 81–96.

Brevik, L. M. (2013). Research Ethics: An investigation into why school leaders agree or refuse to participate in educational research. *Problems of Education in the 21st Century*, *52*, 7- 20.

Brevik, L. M. (2016). The Gaming Outliers: Does out-of-school gaming improve boys' reading skills in English as a second language? In Elstad, E. (Ed.). *Educational technology and Polycontextual bridging* (pp. 39–61), The Netherlands: Sense Publishers.

Brevik, L. M. (2017). Strategies and shoes: Can we ever have enough? Teaching and using reading comprehension strategies in general and vocational programmes. *Scandinavian Journal of Educational Research*, *61*(1), 76–94. DOI: 10.1080/00313831.2015.1075310

Brevik, L. M., & Gunnulfsen, A. E. (2016). Differensiert undervisning for høytpresterende elever med stort læringspotensial. *Acta Didactica Norge*, *10*(2), 212–234.

Brevik, L. M., & Hellekjær, G. O. (2017). Outliers: Upper Secondary School Students Who Read Better in the L2 than in L1. *International Journal of Educational Research*. DOI: https://doi.org/10.1016/j.ijer.2017.10.001

Brevik, L. M., Olsen, R. V., & Hellekjær, G. O. (2016). The Complexity of Second Language Reading: Investigating the L1-L2 Relationship. *Reading in a Foreign Language, 28*(2), 161–182. Retrieved from http://nflrc.hawaii.edu/rfl/October2016/articles/brevik.pdf

Busher, H., & James, N. (2012). The ethical framework of research practice. In A. Briggs, M. Coleman, & M. Morrison (Eds.), *Research methods in educational leadership & management* (pp. 90–103). London, England: Sage.

Cochran-Smith, M. (2003). Assessing assessment in teacher education. *Journal of Teacher Education, 54*(3), 187–193.

Cochran-Smith, M., Feiman-Nemser, S., McIntyre, D. J., & Demers, K. E. (2010). Handbook of research on teacher education: Enduring questions in changing contexts (3rd ed.). Hoboken, NJ: Taylor and Francis.

Cochran-Smith, M., & Fries, K. (2005). Researching teacher education in changing times: Politics and paradigms. In M. Cochran-Smith & K. M. Zeichner (Eds.), *Studying teacher education: The report of the AERA Panel on research and teacher education* (pp. 69–110). Mahwah, NJ: Erlbaum.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Los Angeles, CA: Sage.

Darling-Hammond, L. (2010). Teacher education and the American future. *Journal of Teacher Education, 61*, 35–47.

Dennen, V. P. (2005). From message posting to learning dialogues: Factors affecting learner participation in asynchronous discussion. *Distance Education, 26*(1), 127–148.

Freeman, J., Raffan, J., & Warwick, I. (2010). *Worldwide provision to develop gifts and talents: An international survey.* Research report. Reading, England: CfBT Educational Trust.

Gagné, F. (2005). From gifs to talents: The DGMT as a developmental model. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (pp. 98–119). New York, NY: Cambridge University Press.

Gervis, M., & Capel, S. (2016). Motivating pupils. In S. Capel, M. Leask, & S. Younie (Eds.), *Learning to teach in the secondary school: A companion to school experience* (7th ed.; (pp. 159–179). New York, NY: Routledge.

Grossman, P. (2005). Research on pedagogical approaches in teacher education. In M.

Cochran-Smith & K. M. Zeichner (Eds.), *Studying teacher education. The report of the AERA Panel on Research and Teacher Education* (pp. 425–476). Mahwah, NJ: Erlbaum.

Gunnulfsen, A. E. & Møller, J. (2016). National testing. Gains or Strains? School Leaders Responses to Policy Demands. *Leadership and Policy in Schools*, *16*(3), 455–474. DOI: 10.1080/15700763.2016.1205200

Hammerness, K., & Klette, K. (2015). Indicators of quality in teacher education: Looking at features of teacher education from an international perspective. In G. K. LeTendre & A. W. Wiseman (Eds.), *Promoting and sustaining a quality teaching workforce* (pp. 239–278). Bingley, England: Emerald Press.

Hardre, P. L., & Sullivan, D. W. (2008). Teacher perceptions and individual differences: How they influence rural teachers' motivating strategies. *Teaching and Teacher Education, 24*, 2059–2075.

Hodgson, J., Rønning, W., & Tomlinson, P. (2012). *Sammenhengen mellom undervisning og læring. En studie av læreres praksis og deres tenkning under Kunnskapsløftet*. Sluttrapport. NF-rapport nr 4. Bodø, Norway: Nordlandsforskning.

Idsøe, E. C. (2014). *Elever med akademisk talent i skolen* [Students with academic talent in school]. Oslo, Norway: Cappelen Damm Academic.

Jenset, I. S. (2017). *Practice-based teacher education coursework: An examination of the extent and characteristics of how teacher education coursework is grounded in practice across six teacher education programs in Finland, Norway and California, US* (Doctoral dissertation). University of Oslo, Norway.

Jenset, I. S., Klette, K., & Hammerness, K. (2017). Grounding teacher education in practice around the world: An examination of teacher education coursework in teacher education programs in Finland, Norway, and the United States. *Journal of Teacher Education*. doi:10.1177/0022487117728248

Johnson, R. B., & Christensen, L. (2014). *Educational research: Quantitative, qualitative, and mixed approaches* (5th ed.). Thousand Oaks, CA: Sage.

Kvale, S., & Brinkmann, S. (2009). *Interviews. Learning the craft of qualitative research interviewing.* Los Angeles, CA: Sage.

McLafferty, I. (2004). Focus group interviews as a data collecting strategy. *Journal of Advanced Nursing, 48*(2), 187–194.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: A sourcebook of new methods* (2nd ed.). Thousand oaks, CA: Sage.

Norwegian Ministry of Education and Research. (1998). *Opplæringsloven* [Education Act]. Oslo, Norway: Author.

Norwegian Ministry of Education and Research. (2002). Report No. 16 to the Storting (2001–2002) *Kvalitetsreformen Om ny lærerutdanning Mangfoldig - krevende – relevant* [The Quality Reform. About the new teacher education. Versatile – demanding – relevant]. Oslo, Norway: Author.

Norwegian Ministry of Education and Research. (2008). Report No. 31 to the Storting (2007–2008) *Kvalitet i skolen* [Quality in school]. Oslo, Norway: Author.

Norwegian Ministry of Education and Research. (2009). Report No. 11 to the Storting (2008–2009) *Læreren: rollen og utdanningen* [The teacher: Role and education]. Oslo, Norway: Author.

Norwegian Ministry of Education and Research. (2013). *Læreplan for grunnskolen og videregående skole* [Curriculum for elementary and secondary school]. Oslo, Norway: Author.

Norwegian Ministry of Education and Research. (2014). *NOU 2014:7 Elevenes læring i fremtidens skole – et kunnskapsgrunnlag* [Pupils' learning in the school of the future – a knowledge base]. Oslo, Norway: Author.

Norwegian Ministry of Education and Research. (2015). *NOU 2015:8 Fremtidens skole. Fornyelse av fag og kompetanser* [The school of the future – Renewal of subjects and competences]. Oslo, Norway: Author.

Norwegian Ministry of Education and Research. (2016). *NOU 2016:14 More to gain. Better learning for students with higher learning potential.* Oslo, Norway: Author.

Renzulli, J. S. (1977). *The enrichment triad model: A guide for developing defensible programs for the gifted and talented*. Mansfield Center, CT: Creative Learning Press.

Renzulli, J. S. (2002). Emerging conceptions of giftedness: Building a bridge to the new century. *Exceptionality, 10*(2), 67-75. DOI: http://10.1207/S15327035EX1002_2

Renzulli, J. S. (2005). Applying Gifted Education Pedagogy to Total Talent Development for All Students. *Theory Into Practice, 44*(2), 80-89. DOI: http://10.1207/s15430421tip4402_2

Renzulli, J. S. (2012). Reexamining the Role of Gifted Education and Talent Development for the 21st Century: A Four-Part Theoretical Approach. *Gifted Child Quarterly*, *56*(3) 150–159. DOI: http://10.1177/0016986212444901

Renzulli, J. S., & Reis, S. M. (1997). The schoolwide enrichment model: A how-to guide for educational excellence (2nd ed.). Mansfield Center, CT: Creative Learning Press.

Santangelo, T., & Tomlinson, C. A. (2012). Teacher educators' perceptions and use of differentiated instruction practices: An exploratory investigation. *Action in Teacher Education*, *34*(4), 309–327.

Solberg, M. T. (2017). *The differentiated English classroom. Teachers' approaches to differentiated instruction in group lessons in lower secondary school* (Master's thesis). University of Oslo, Oslo, Norway.

Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Stemler, S. E. (2015). Content analysis. In R. Scott & S. S. Kosslyn (Eds.), *Emerging trends in the social and behavioral sciences:* An Interdisciplinary, Searchable, and Linkable Resource (pp. 1–14). New York, NY: Wiley. DOI: 10.1002/9781118900772.etrds0053

Stodolsky, S. S., & Grossman, P. (2000). Changing students, changing teaching. *Teachers College Record*, *102*, 125–172.

Theilgaard, I., & Raaschou, N. (2013). *Køberhavnerbarometeret 2011 – resultater og analyse* [Copenhagen barometer 2011 – results and analysis]. Copenhagen, Denmark: Afdelingen for Pædagogisk Faglighed.

Tomlinson, C. A. (2014). *The differentiated classroom*. *Responding to the needs of all learners* (2nd ed.). Alexandria, VA: Association for Supervision & Curriculum Development.

Tomlinson, C. A., Brimijoin, K., & Narvaez, L. (2008). *The differentiated school: Making revolutionary changes in teaching and learning*. Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C. A., Callahan, C. M., Tomchin, E. M., Eiss, N., Imbeau, M., & Landrum, M. (1997). Becoming architects of communities of learning: Addressing academic diversity in contemporary classrooms. *Exceptional Children*, *63*, 269–282.

Wallace, B., Leyden, S., Montgomery, D., Winstanley, C., Pomeranz, M., & Fitton, S. (2009). *Raising the achievement of all pupils within an inclusive setting: Practical strategies for developing best practice*. London, England: Routledge.

Winstanley, C. (2016). Closing the achievement gap: Personalising learning. In S. Capel, M. Leask, & S. Younie (Eds.), *Learning to teach in the secondary school: A companion to school experience* (7th ed.; pp. 310–326). New York, NY: Routledge.

Yin, R. K. (2017). *Case Study Research and Applications: Design and method* s. Thousand Oaks, CA: Sage.