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Perceptions of Novice Teachers Applying Differentiated Instruction in Heterogeneous Elementary Classrooms

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
2020

Abstract

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by

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MS, Hood College, 1997

BA, American University, 1993

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Differentiated instruction (DI) is an effective approach to maximize students' academic success in diverse elementary classrooms. But a current concern in educational research is an insufficient understanding of how novice elementary teachers perceive and apply DI to support student success, especially as student diversity continues to increase, creating challenges to meeting students' needs. Novice teachers are expected to positively influence student learning through their teaching methods at the same level as experienced teachers. Yet, it is unclear how they use DI to do so. The purpose of this study was to provide a deep understanding of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. The study's approach is framed by Vygotsky's zone of proximal development and Tomlinson's model of DI, both of which hold that teaching must focus on individual student needs. Research questions explored novice teachers' perceptions about DI and how they report using DI in the classroom. Data for this general qualitative study were gathered through semistructured interviews with 12 novice elementary teachers. Data analysis was conducted using a priori, open, and axial codes. Findings revealed that although novice teachers are committed to meeting student needs, they define DI narrowly and apply it in ways that do not reflect DI's complex pedagogy. The results of the study contribute to positive social change through a nuanced understanding of the instructional practices of novice teachers, which provides valuable insight for those who support novice teachers in their professional growth. Improving the complex instructional practice of DI in novice teachers may maximize learning outcomes for all students, particularly those with diverse cognitive, linguistic, cultural, and socioeconomic characteristics.

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Dedication

I dedicate this dissertation to my husband, who has supported me in every step of this process. Like you, there were times when I questioned why I would pursue such an undertaking! I also dedicate this work to my children, Jake and Kate. Be life-long learners, and whatever you choose to do along the way, do it with excellence.

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Chapter 1: Introduction to the Study

A current concern in educational research is an insufficient understanding of how novice teachers perceive and apply differentiated instruction (DI) in kindergarten through fifth-grade heterogeneous classrooms. It is widely accepted that the instructional practices and experience of teachers influence the academic success of students. Novice teachers, specifically, lack experience in the classroom that may be necessary to support student success. Understanding the perceptions and practices of novice teachers who have less teaching experience has the potential to positively influence their instructional practices and the success of their students, as well as the practices of novice teachers and the success of students on a broader scale. In the proposed study, I explored novice teachers' perceptions and applications of DI to address an insufficient understanding identified in the research.

There is a body of research to support the importance of teacher experience and effective instructional classroom practices. The influence of teacher experience was supported by Kini and Podolsky (2016). In their meta-analysis of teacher effectiveness, they established that more experienced teachers have generated greater gains in student achievement. Of the 30 studies they evaluated, 28 demonstrated a statistically significant, positive correlation between years of teaching experience and student achievement on standardized tests. Several studies in this meta-analysis also documented a correlation between teaching experience and improved attendance, motivation, and classroom behavior of students. The researchers concluded that teachers with more years of experience were better able to support student learning. The influence of effective

instructional practices on student success was supported by R. Garrett and Steinberg (2015), who found a significant relationship between teacher instructional practices and student achievement. The researchers used the widely employed Framework for Teaching evaluation tool (Danielson, 2013) to measure teacher effectiveness in instructional practices. They confirmed a correlation between teacher practice and student achievement in elementary math and language arts classrooms. Research has also found a correlation between teacher instructional choices and student learning (Fitchett & Heafner, 2018). Thus, both teacher experience and effective classroom practices play a role in student success (Allington, 2011; Hanushek, 2011; Marzano, Pickering, & Pollock, 2001; Nye, Konstantopoulos, & Hedges, 2004; Rockoff, 2004).

However, there is a wide range of diversity in schools that may complicate the task of teaching, such as cognitive, linguistic, cultural, and socioeconomic diversity. Most U.S. classrooms include students who have a wide range of abilities. The U.S. Department of Education Office for Civil Rights (2016) confirmed a level of cognitive diversity, stating that 14% of students received special education services in the 2013-2014 school year. Also, the National Center for Learning Disabilities (2014) estimated the number of students requiring services to be closer to 20% when considering undiagnosed students. Adding to the range of diversity, 6.7% of all students were designated as gifted in 2014 and required instruction to meet their academic needs (National Center for Education Statistics, 2018). Additional diversity in U.S. classrooms is represented by students who speak a language other than English as their primary language. The national average of students identified as English language learners (ELLs)

was 9.5% in 2015 (National Center for Education Statistics, 2015). In addition, diversity in race and ethnicity continue to increase in schools nationwide (National Center for Education Statistics, 2019). Compare the year 2000, when 38% percent of school-age children were people of color, to 2017, with 49% being people of color (National Center for Education Statistics, 2019). Finally, another contributor to the diversity is students of low socioeconomic status (SES), who may experience academic deficits due to a lack of access to early education opportunities and lower parental expectations (Slavin, 2018). Almost 18% of school-aged children were living in poverty in 2016 (Fontenot, Semega, & Kollar, 2018). Because this wide range of diversity may negatively influence teacher effectiveness (Alsubaie, 2015; R. Garrett & Steinberg, 2015), teachers often find the heterogeneous classroom to be a challenging place to provide effective instructional practices. Heterogeneous classrooms have students with a wide range of cognitive, linguistic, cultural, and socioeconomic characteristics (Tomlinson, 2014).

To address multiple aspects of diversity in the classroom, many educators have embraced DI, which plays a key role in maximizing achievement in heterogeneous classrooms by meeting the diverse needs of students (Hartwig & Schwabe, 2018). Through DI, educators take student characteristics into account by adjusting "content, process, and products based on student readiness, interest, and learning profile" (Tomlinson, 2014, p. 18) to maximize classroom learning. DI focuses on the success of each learner through the lenses of cognitive, linguistic, cultural, and socioeconomic diversity.

Many studies have reported a positive relationship between the use of DI and student success. Valiandes (2015) investigated the effect of DI on students in mixed-ability, multicultural elementary classrooms. The researcher found that in classrooms where teachers implemented DI interventions, students scored higher on comprehension and literacy tests than those in classrooms without DI and that these gains occurred across cultural and socioeconomic variables. Förster, Kawohl, and Souvignier (2018) documented similar results; the students in their treatment group who received DI showed greater growth in word fluency than students in their control group. They reported that the students with weaker reading skills benefitted more from the treatment than other students. In a qualitative case study, Sentürk and Sari (2018) found through interviews and observations that both teachers and students perceived DI as a contributing factor to improved scientific process skills and science literacy in fourth-grade classrooms. Manship, Farber, Smith, and Drummond (2016) conducted a case study of a preschool through third-grade program in which DI was perceived to contribute to increased student vocabulary and oral language skills. Collectively, this research affirms the potential that DI has to improve student achievement, and that successful DI experiences facilitate the success of students.

Although it is difficult for teachers to apply DI in heterogeneous classrooms, possibly due to a lack of classroom experience and specialized training (Birnie, 2015; Tomlinson, 2014), teachers may effectively provide DI with appropriate preparation through support from administration and professional development (Baker & Harter, 2015; Birnie, 2015; Suprayogi, Valcke, & Godwin, 2017). Zhukova (2018) reported that

novice teachers were likely to have challenges with adapting instruction to the needs of individual students when they entered the classroom; however, the participants in the study conducted by Zhukova demonstrated growth in instructional practices over time. Birnie (2015) described multiple cases of successful DI application by teachers who started with small changes in instruction and became more proficient in DI as they modified and refined instructional approaches gradually. Baker and Harter (2015) reported that teachers in their study were able to apply differentiation successfully but acknowledged that these teachers received supports such as professional development, assistant participant researchers, and administrative allowance of flexibility in instructional methods. Suprayogi et al. (2017) suggested that teachers lacking experience did not demonstrate an understanding of DI or practice it in the classroom. However, they reported that teachers built pedagogical knowledge, including that of DI, over time. The researchers noted that experienced teachers more effectively utilized DI in the classroom. Tomlinson (2014) recommended professional development that (a) supports teachers in making small but increasingly complex changes, (b) facilitates time for planning for DI, and (c) provides support and encouragement. Additionally, Tomlinson (2016) reported that novice teachers often lack exposure to quality models of differentiated instruction. Given opportunities to gain experience and training, teachers may apply DI effectively. Teachers can maximize student learning when they use DI; however, they may not be prepared to meet the individual needs of students at the beginning of their teaching careers.

Novice teachers lack experience in the classroom that may be necessary to support student success. But understanding the perceptions and practices of novice teachers who have less teaching experience can positively influence their instructional practices and the success of their students as well as the practices of novice teachers and the success of students on a broader scale. In this study, I explored novice teachers' perceptions and applications of DI to address an insufficient understanding identified in the research. Exploring the perceptions and application of DI by teachers in kindergarten through fifth-grade heterogeneous classrooms may initiate social change by increasing the understanding of DI through the eyes of the novice teachers. Understanding this perspective may improve the application of DI and maximize student learning in the classrooms of novice teachers.

In the remainder of this chapter, I present an overview of the study. The background summarizes research literature related to the scope of the study topic and describes a gap in practice in the discipline that the study will address. Closely aligned problem and purpose statements follow, with research questions designed to qualitatively explore the phenomenon of novice teachers and their perceptions about and application of DI. I then present the conceptual framework for the study and through the nature of the study, I provide a rationale for methodological choices. Through the definition of terms, study assumptions, and scope and delimitations, I provide contextual information for the study. Finally, I present the significance of the study in alignment with the study's various components.

Background

There is a gap in practice between the research-based application of DI expected of novice teachers and the current practices of most novice teachers. Novice teachers are held to the same standards as veteran teachers and are expected to influence student learning positively through their teaching methods, yet many cannot do so. Administrators and parents expect novice teachers to enter the profession fully prepared, but no teacher training program prepares teachers with fully developed instructional skills (Mockler, 2017; Schumacher, Grigsby, & Vesey, 2015). However, new teacher quality is important for facilitating learning for diverse groups of students (Bastian, McCord, Marks, & Carpenter, 2017). Schumacher et al. (2015) recommended that hiring practices for teachers should evaluate measures of teaching quality, including the ability to differentiate instruction, suggesting that even novice teachers should be skilled in this area. Upon entering the profession, teachers are expected to display mature instructional practices. There are multiple factors that play a role in the gap in practice regarding novice teachers using DI to positively influence student learning: (a) increased student diversity, (b) lack of in-service support and training, and (c) novice teachers' concerns about their ability to meet student needs.

Student Diversity

Increased student diversity necessitates strong instructional skills in novice teachers (Tomlinson, 2014; Tung et al., 2015). Before the progressive movement in the early 20th century, most teachers utilized a traditional educational model rooted in industrialism with a standardized curriculum and progression based on student age (Wiles

& Bondi, 2014). This model operated under the assumption that students developed at similar, consistent rates and that a standardized education was effective and even desirable (Stone, 2018). Since then, educational psychologists have expanded knowledge of how each child's development affects learning, including individual learning progressions and needs (Vygotsky, 1935), unique strengths (Gardner & Hatch, 1989), and varying interests (Dewey, 1938). Further, recent education policies such as the Every Student Succeeds Act (U.S. Department of Education, 2019), the Individuals with Disabilities Act, and least restrictive environment requirements (U.S. Department of Education, 2018) place additional demands on teachers to address a wide range of academic ability within classrooms. Increased cultural and socioeconomic diversity also create challenges for meeting student needs. The academic needs of students who have a primary language other than English may not be accurately identified (Allen, 2017), and some students are at a disadvantage because they receive less support at home than students from more affluent families (Freidus & Noguera, 2017). Thus, changes within educational settings place great demands on all teachers to competently accommodate multiple aspects of student diversity in heterogeneous classrooms.

Further, a high percentage of diverse students are placed with novice teachers, which may negatively influence their academic success. Experienced teachers are often assigned to teach the most capable students, leaving the students most in need of effective teaching with less-experienced teachers, such as students with lower SES, students of color, and ELLs (Best & Winslow, 2015; Goldhaber, Lavery, & Theobald, 2015; McLean & Price, 2019). For instance, teachers in Title I schools have had an average of 1 year

less experience than teachers overall (Bruno, Rabovsky, & Strunk, 2019; Carver-Thomas & Darling-Hammond, 2017). Additionally, in 2016, 15% of teachers in the United States were in their first 3 years of teaching, and in 2015 the percentage of students taught by teachers with 5 or fewer years of experience nationwide was 25% (Rahman, Fox, Ikoma, & Gray, 2017; Taie & Goldring, 2018). However, the rate was significantly higher for students in minority ethnic and racial groups, students with disabilities, and students with lower SES; as many as 32% of students in these categories had teachers with fewer than 5 years of experience (Rahman et al., 2017). New teachers are often assigned to schools with students of lower socioeconomic status (Goldhaber et al., 2015) as well as higher enrollments of students of color and ELLs (U.S. Department of Education Office for Civil Rights, 2014). Less-experienced teachers leave the students most in need of DI vulnerable to insufficient teaching practices, underscoring the importance of novice teachers' understanding and effective use of DI. Because of the influence teachers have in the classroom and the frequency with which new teachers are assigned to students who require a differentiated approach, the current study is needed to expand knowledge of novice teachers' understanding of and application of DI in kindergarten through fifth-grade heterogeneous classes to positively influence student learning.

Support and Training for Novice Teachers

In heterogeneous classrooms, teachers are expected to perform at a high level (Decristan, Fauth, Kunter, Büttner, & Klieme, 2017), but they often are unable to do so due to a lack support and training. Teachers have completed their pre-service training with an understanding of the need to differentiate instruction but without the skills to do

so (Brevik, Gunnulfsen, & Renzulli, 2018), making pre-service and in-service teacher training addressing DI necessary. Differentiation is often was not practiced in the inclusive classrooms of novice teachers (McLeskey, Billingsley, & Ziegler, 2018; Pozas, Letzel, & Schneider, 2019). Within a heterogeneous classroom, the failure of a teacher to address individual learning needs might hinder learning; alternately, a teacher who addresses individual needs may improve the quality of learning for all students. In heterogeneous classrooms, the quality of teacher instruction can be the defining factor for positive learning outcomes (Decristan et al., 2017). But with less support and training in DI, novice teachers are less likely to meet student needs in heterogeneous classrooms.

Novice Teachers' Concerns About Meeting Student Needs

Many novice teachers have reported feeling overwhelmed by the expectation to meet the full range of needs of the students in their classrooms (Helms-Lorenz & Maulana, 2016). The concerns of novice teachers in schools with diverse student populations include their inability to adapt to differences in students' cultural background and cognitive development (Gaikhorst, Beishuizen, Roosenboom, & Volman, 2017). Teachers have also expressed a lack of confidence about implementing learning interventions that address students' individual needs when transferring from coursework to classroom application (Hurlbut & Tunks, 2016). Many novice teachers have felt inadequately prepared to provide instruction to diverse student groups (Meeks, Stephenson, Kemp, & Madelaine, 2016). New teachers have often felt ill-prepared to apply instructional skills, particularly when required to differentiate instruction from the beginning of their teaching practice (Suprayogi et al., 2017). The demands placed on

novice teachers have resulted in stress that negatively affects their ability to provide effective instruction in the classroom (Helms-Lorenz & Maulana, 2016), so they may face instructional challenges related to student differences.

Why the Study is Needed

This study is needed to positively influence the learning of students in novice teachers' classrooms. Further research is needed to expand understanding about what novice teachers know and what instructional practices they report they apply in the classroom. An understanding of novice teachers' perceptions and applications of DI will address the gap in practice related to DI and contribute to knowledge in the education field by clarifying how novice teachers understand and apply DI. The study's findings may provide insight for those supporting novice teachers so that novice teachers can meet the needs of diverse students with confidence. The results may help novice teachers provide effective DI and maximize learning for diverse students.

Problem Statement

The problem addressed in this study was an insufficient understanding of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. The problem was evident in both a gap in the research literature and a gap in the instructional practices of novice teachers.

The Gap in Practice

There is a gap in practice about how novice teachers perceive and apply DI in their classrooms. Novice teachers have been predominantly concerned with being accepted by their students and peers, managing classroom routines, and coping with

stress and anxiety. It is often not until the end of their second year of teaching that teachers focus on meeting the needs of students, understanding individual student potential, and addressing the multitude of student characteristics in the classroom, all components of DI (Zhukova, 2018). Further, in a study of two teachers over their pre-service and novice years of teaching, they did not apply DI in the first 2 years and were not able to articulate what elements of differentiation they had learned about in pre-service coursework (Dack & Triplett, 2019). Even though teachers develop an understanding of student-focused instructional practices such as DI, they may not be implementing those practices. Pre-service teachers have also had trouble transferring the knowledge they learned in teaching methods courses about response to intervention (RTI) as an approach to DI (RTI Action Network, 2019) into their classroom teaching experiences (Hurlbut & Tunks, 2016). Although novice teachers are often willing to try DI in the classroom, in many cases, their efforts fall short of effective instructional practice (Dack & Triplett, 2019).

Whereas the previously described research was qualitative, quantitative researchers have also suggested a gap in practice. S. Garrett (2017) documented a statistically significant lower level of self-efficacy and implementation of DI in first-year teachers compared with teachers with more experience. Additionally, through quantitative survey research, Costa, Almeida, Pinho, and Pipa (2019) identified the practice of differentiation as a primary concern of school leaders across several countries in Europe. Thus, there is a need to support new teachers with the practice of differentiation and address the gap between the instructional practices that novice

teachers understand and apply in heterogeneous classrooms and practices that current research supports.

The Gap in the Literature About Practice

There is also a gap in the literature related to the research problem. Although much research about DI applies to teachers in general, few studies have explored novice teachers' beliefs and practices related to DI (Dack & Triplett, 2019). Some researchers have also recommended the need for a more in-depth understanding of DI as it is practiced in the classrooms of both experienced and novice teachers (Coubergs, Struyven, Vanthournout, & Engels, 2017; De Neve, Devos, & Tuytens, 2015). For example, De Neve et al. (2015) conducted a quantitative study investigating the factors that contributed to the use of DI by teachers. Although the researchers specifically examined the influence of autonomy, professional learning communities, and self-efficacy, they stated that few studies have qualitatively investigated the conditions identified by teachers that facilitated their effective use of DI. Coubergs et al. (2017) also conducted a quantitative study in which they evaluated a tool used to measure the application of DI. Though they found the quantitative tool to be valid and reliable, they recommended additional qualitative studies, specifically individual interviews, to deepen understanding of the practice of DI. Using group interviews, Brevik et al. (2018) found that novice teachers expressed concerns about enacting DI, but recommended further research using individual interviews to enrich data on the topic. Additionally, studies documenting a gap in practice have recommended further research into novice teachers' experiences with DI (Hurlbut & Tunks, 2016; Zhukova, 2018). A synthesis of the literature indicates that there

is a gap in the qualitative research literature about how novice teachers perceive and apply DI.

The current study addresses both the gap in the literature and the gap in practice. It was appropriate to address the need for qualitative research to explore novice teachers' perceptions and applications of DI. Student diversity is increasing, and the number of students taught by early career teachers is high. Though DI is an effective way to improve student learning, it is unclear what novice teachers understand about or how they apply DI in their classrooms. Teachers may enter the field without proper knowledge and skills to meet diverse student needs through DI practices, reducing students' opportunities for academic success. Further research can provide insight into how novice teachers perceive and apply DI to support student success in the classroom.

Purpose of the Study

The purpose of this general qualitative study was to explore how novice teachers perceived and applied DI in kindergarten through fifth-grade heterogeneous classrooms. DI refers to the process of designing instruction to meet diverse student needs in the classroom, and novice teachers are expected to apply DI as effectively as experienced teachers. There is a lack of knowledge about how novice teachers perceive and apply DI (Brevik et al., 2018; Coubergs et al., 2017; De Neve et al., 2015), and a deeper understanding of these phenomena is beneficial for several reasons. First, instructional practices may influence elementary students' success (Decristan et al., 2017; Manship et al., 2016; Valiandes, 2015). Additionally, understanding how novice teachers perceive and apply DI may guide efforts to support novice teachers as they use DI to maximize

student learning in heterogeneous classrooms (Gaikhorst et al., 2017; Gaitas & Martins, 2017). Finally, an increased understanding of novice teachers' perceptions may inform how they may improve the application of DI at the beginning of their teaching careers.

Research Questions

When teachers enter the field of education, they are expected to provide effective instruction to support learning for all students regardless of diverse student characteristics. One approach to addressing classroom diversity is DI. However, it is unclear how novice teachers perceive DI and how they apply DI in the classroom. I addressed this problem in the current study with the following guiding research questions:

1. What are novice teachers' perceptions about DI in their kindergarten through fifth-grade heterogeneous classrooms?
2. What instructional practices do novice teachers describe using to promote the success of their students in kindergarten through fifth-grade heterogeneous classrooms?

Conceptual Framework

The conceptual framework for this study is based on Vygotsky's (1935) sociocultural theory, which holds that learning and development are mediated by social and cultural factors, including social interaction. One key element of this theory is the zone of proximal development (ZPD). ZPD describes the conditions in which students receive instruction beyond what they are capable of learning independently but in which

they can learn with assistance from more able others (Vygotsky, 1935). Central to ZPD is the element of scaffolding instruction within a critical learning zone.

Additionally, the current study was grounded in Tomlinson's (2014) model of DI, which defines DI and the key elements it encompasses, including (a) instructional decision-making in DI, (b) DI as responsive teaching, and (c) student characteristics relevant to DI. Tomlinson built the model of DI on Vygotsky's ZPD by acknowledging student variance and addressing learner needs in the context of what they are ready to learn next.

There are other logical connections between the key elements of Vygotsky's (1978) theory and Tomlinson's (2014) model of DI within the conceptual framework. For example, teachers who understand Tomlinson's concept of student readiness are able to determine students' ZPD (Vygotsky, 1978). Thus, teachers understand what students need to learn next, and this informs instructional practices. Further, the instructional decision-making process described by Tomlinson assists teachers with the development of instructional scaffolding that best supports student learning, as described by Vygotsky. Additionally, Tomlinson's description of DI as a method of responsive teaching reflects a requirement of Vygotsky's sociocultural theory, which asserts that social interaction is necessary for more effective learning to take place. The connections between the work of Vygotsky and Tomlinson support teachers in the application of DI and strengthened the conceptual framework used in this study.

Tomlinson's (2014) elements of DI, informed by Vygotsky's (Vygotsky, 1978) social aspect of learning within the ZPD, framed the research design of the study and

provided a lens to guide analysis and interpretation within the study. The conceptual framework also informed the purpose of the study, which was to explore how novice teachers perceive and apply DI. Because Vygotsky and Tomlinson defined DI's parameters, I also defined DI in alignment with Vygotsky's and Tomlinson's work, including sociocultural theory, ZPD, scaffolding, instructional decision-making in DI, DI as responsive teaching, and student characteristics relevant to DI. The research questions align with the conceptual framework because they allowed for the exploration of the key elements of the framework as described by Vygotsky and Tomlinson.

Additionally, I constructed the interview protocol to explore participants' perceptions of the key elements of the conceptual framework. First, the protocol addressed Vygotsky's (1978) social aspect of learning within the ZPD, which requires interaction between individuals as a mediator of learning, more specifically between a child and a more knowledgeable other (Kozulin, Gindis, Ageyev, & Miller, 2003). Second, the interview protocol addressed Tomlinson's (2014) practical definition and application of DI, including the key elements: (a) relevant student characteristics, (b) instructional decision-making in DI, and (c) DI as responsive teaching.

Further, the conceptual framework informed data analysis. During the initial analysis, a priori codes were drawn directly from the conceptual framework and used to analyze the data collected in interviews. These a priori codes were deductive and determined before data collection based on topics or themes anticipated by the researcher (Burkholder, Cox, & Crawford, 2016). The use of a priori codes aligns with a general qualitative research approach in which a researcher seeks to understand a predetermined

topic (Percy, Kostere, & Kostere, 2015). In the current study, the subject under study (DI), the conceptual frameworks of Vygotsky (1978) and Tomlinson (2014), and the a priori codes are closely aligned. Because the purpose of the study was to explore participants' perceptions of DI as they relate to the conceptual framework, I used a thematic analysis approach to identify similarities, differences, and connections within the data across study participants (Ravitch & Carl, 2016). The research questions, data collection procedures, and data analysis are purposefully aligned to the conceptual framework to address the research problem and accomplish the purpose of the study. I describe the conceptual framework in more detail in Chapter 2.

Nature of the Study

I used a general qualitative research approach to address the purpose of this study, which was to explore how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. Qualitative approaches involve the collection of detailed, in-depth accounts of participants' experiences and perceptions (Percy et al., 2015). These in-depth accounts are a crucial factor in the qualitative research model (Ravitch & Carl, 2016; Rubin & Rubin, 2012). More specifically, I used a general qualitative approach that is distinct from other qualitative approaches. Researchers using a general qualitative approach seek to understand phenomena, but not within a bounded unit (such as case study), not by examining the underlying structure (as in phenomenology), and not seeking to generate substantive theory (as in grounded theory; Merriam & Tisdell, 2016). Instead, the purpose of general qualitative research is to understand the experiences of people and how they make sense of those experiences. As

such, a general qualitative approach allowed me to explore the phenomena of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms.

Data collection and analysis also informed and were informed by the selection of a general qualitative approach. Interviews are often used as a source of data for general qualitative research (Merriam & Tisdell, 2016; Percy et al., 2015). In the current study, I used semistructured individual interviews with 12 novice teachers to collect data reflecting their perceptions about DI and its application in their classrooms. Semistructured interviews were chosen to address the exploration of the phenomena within the constructs of the guiding conceptual framework. Similarly, data analysis included a priori codes based on the key concepts of the conceptual framework to explore novice teachers' understandings and perceptions. Open and axial codes were also used to allow themes to emerge and be analyzed in relation to each other (Ravitch & Carl, 2016). The findings of a general qualitative study are the themes and recurring patterns derived from the collected data (Merriam & Tisdell, 2016). Exploration of the phenomena through this methodology yielded rich, complex data and analysis. I provide more detail about the general qualitative approach in Chapter 3.

Definitions

For this study, the following definitions provide a common language and an understanding of key concepts and constructs associated with novice teachers' understanding of and application of DI.

Differentiated instruction: Instruction provided in the classroom that is guided by teacher assessment and modified through "content, process, and product based on student readiness, interest, and learning profile" (Tomlinson, 2014, p. 18).

Heterogeneous classroom: For the purposes of this study, a heterogeneous classroom is a classroom that consists of students with a wide range of characteristics, including those in Tomlinson's model of DI: cognitive, linguistic, cultural, and socioeconomic (Tomlinson, 2014).

Learning profile: A component of Tomlinson's model of DI that describes how a learner prefers to learn, which may be influenced by academic ability, gender, culture, or learning style (Tomlinson, 2014).

Novice teacher: For the purpose of this study, a certified teacher in his or her first or second year of teaching (Flannery, 2017; Goldrick, 2016). See the Participant Criteria section in Chapter 3 for further explanation of the definition of "novice."

Process: A component of Tomlinson's model of DI including activities facilitated by the teacher through which students use key skills and make sense of essential knowledge (Tomlinson, 2014).

Zone of proximal development (ZPD): The conditions in which students receive instruction beyond what they are capable of learning independently but in which they can learn with assistance from others (Vygotsky, 1935).

Assumptions

This qualitative study included the following assumptions. I assumed that participants would answer the interview protocol with candor and honesty. I assumed the

answers they provided during the interview accurately reflected their DI practices in the classroom. Confidentiality was preserved to encourage such honest discussion. Without candor from participants, the credibility of the study results are questionable (Shenton, 2004). Due to continued classroom diversity, it was also assumed that DI was broadly valued and used as an instructional approach in elementary classrooms. Classroom diversity precipitates the necessity of and the need for further study of DI (Valiandes, 2015).

Scope and Delimitations

The problem addressed in this study was an insufficient understanding of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. The scope of the study included 12 novice teachers in their first or second year of teaching. Participants taught in self-contained classrooms found typically in lower elementary grades or subject-specific classrooms often found in upper elementary grades. The teachers in the current study had the common characteristics of teaching in heterogeneous, elementary classrooms in schools located in the eastern portion of the United States and holding a state teaching certificate. Certified novice teachers in elementary classrooms were chosen to provide a narrow focus on participants with common characteristics but allow for a wide representation of this population, not bounded by a single location, as is consistent with a general qualitative approach (Neergaard, Olesen, Andersen, & Sondergaard, 2009; Sandelowski, 2000). The scope of the current study aligns with the problem, purpose, and research questions.

Delimiters were established to define boundaries for the study. Teachers in their third year of teaching and beyond were excluded from the study because they did not address the research problem focus on novice teachers. Teachers of grades higher than fifth grade were excluded, and individuals such as teaching specialists or teachers designated as special educators were excluded as well as those with conditional certification or credentials. Data were collected from 12 participants through semistructured interviews lasting 60 to 90 minutes. The relatively small, non-random sample and the single source of data may limit the transferability of the study (Merriam & Tisdell, 2016). Additionally, the results are based on participant self-reports rather than observational data or document analysis, which may have provided more reliable measures of the application of instructional practices (see Coubergs et al, 2017; Doran, 2017). An additional delimitation was the requirement that the participants hold a teaching certificate. The boundaries of the study may limit the transferability of study results to a broader population of novice teachers (Merriam & Tisdell, 2016). However, generalizability and transferability are not necessarily goals of qualitative research (Ravitch & Carl, 2016). Qualitative research seeks to develop rich, descriptive data that provide contextual results. Findings can be used by others to determine the transferability of a study to their research context when provided with as much information as possible (Amankwaa, 2016; Ravitch & Carl, 2016).

The conceptual framework, based on the work of Tomlinson (2014) and Vygotsky (1978), grounded this study; however, there are other valid conceptual frameworks related to DI that were not used to define this study. For example, DI is grounded in

aptitude-treatment interaction theory, which holds that learning is maximized when particular student attributes are matched with specific instructional approaches (Cronbach & Snow, as cited in Hartwig & Schwabe, 2018). However, the aptitude and treatment elements of this theory may be defined very broadly. Tomlinson's model provided more practical parameters and definitions for student characteristics and approaches to instruction that were suitable for this study. Additionally, Gardner's multiple intelligences theory (Gardner & Hatch, 1989) can be associated with DI. Gardner identified more than eight areas of intelligence in humans that assist in solving problems and creating products and create individual profiles (Sternberg & Kaufman, 2011). These profiles acknowledge the distinctive characteristics of students like DI; however, multiple intelligences theory does not address how the theory influences instruction in the classroom. For these reasons, DI was defined as only that which aligns with Vygotsky's and Tomlinson's research.

Limitations

There were limitations to the current study with the potential to influence its trustworthiness. In the current study, possible results of the limitations include a decrease in the transferability, credibility, and confirmability of the study. Limitations were found in the characteristics of the sample, the nature of the data collection tool, and the potential for researcher bias.

The sample of participants was limited in several ways. First the sample size included only 12 participants. This allowed for in-depth data from each participant but limited a wider range of participant perspectives. Though the sample was not intended to

be limited to a section of the United States, the participants recruited were only from the Eastern portion of the country. Similarly, the participants were not intended to be limited by race, but all the participants recruited for the study were White. For these reasons, the sample was a limitation with the potential to decrease transferability or generalizability.

The data collection tool also served as a limitation. The open-ended nature of the interview protocol allowed for the collection of data that sometimes strayed from the intended purposes of the study and its research questions. The data were collected by only one tool as well, limiting the variety of data sources and potential data triangulation. Finally, the collection of data via video conference may have limited access to certain valuable aspects of face-to-face interviews, including participant body language. These served as limitations to the study's credibility.

A final limitation was the potential for researcher bias, which created the possibility for decreased confirmability. As a former teacher who has applied DI in the classroom, I have perspectives about the concept that could have influenced the way I conducted the interview. I was also the sole researcher and evaluator of data. Further, my role as a researcher could have created the potential for prestige bias on the part of participants, influencing them to give answers they deemed as correct or desirable. Further discussion about the limitations of the study, including their implications in the study and the ways they were mitigated, are included in Chapter 3 and Chapter 5.

Significance

In this study, I addressed a gap in practice and a gap in the literature by exploring novice teachers' perceptions and application of DI. Although the benefits of DI and the

challenges novice teachers have in the application of DI have been established in research, this study provides a nuanced understanding of the interrelation between the two. Given the importance of DI to student success (Coubergs et al., 2017; Hurlbut & Tunks, 2016; Valiandes, 2015), the current study may contribute to positive social change by providing a rich understanding of novice teachers' perceptions and application of DI in the elementary classroom. The findings of this study help clarify novice teacher perceptions of DI. Recognizing the status of DI in the classrooms of novice teachers may result in social change by assisting educational decision makers in designing instructional supports for novice teachers that may result in successful student outcomes (Coubergs et al., 2017; Gaitas & Martins, 2017).

The results of this study inform three key groups responsible for maximizing student achievement in a school setting. First, an increased understanding of the phenomena may inform administrator decisions for professional development to support novice teachers. Adminstrators may benefit from the understanding and use of tools to build and evaluate teachers' DI practices, such as the Differentiated Instruction Continuum for Administrators (Staff Development for Educators, 2019). Second, additional insight into novice teacher perspectives may assist teacher mentors in providing efficacious coaching experiences (see also Yirci, 2017). Novice teachers and their students may also benefit from teacher reflection on the application of DI in heterogeneous classrooms. A likely benefit, for example, may be increased learning in the classroom. Student learning increases when teachers have opportunities to reflect on instructional practices (Darling-Hammond, Hyler, & Gardner, 2017). This study

contributes to knowledge in the education field by clarifying how novice teachers understand and apply DI. The results may help novice teachers provide effective instruction and maximize learning for diverse students.

Summary

There is a gap in practice regarding the perceptions and application of DI by novice teachers, as indicated in the literature. Though DI is an effective practice used by teachers to meet the needs of diverse students, there is much to know about how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. Novice teachers are expected to use effective methods as they begin their teaching careers; however, many may find it difficult to meet the needs of diverse students through effective instructional practices such as DI. Because instructional practices and a teacher's level of experience influence student learning, it is necessary to address the gap in practice and the gap in the literature concerning novice teachers and DI.

In this chapter, I provided an outline of the study. Background information indicated a rationale for the need for the research as well as the problem and questions addressed. Methodological choices were described as well as the assumptions and delimitations that framed the study. Grounded in the work of Vygotsky (1978) and Tomlinson (2014), this chapter also described how I explored novice teachers' perceptions and applications of DI in kindergarten through fifth-grade heterogeneous classrooms through a general qualitative approach. Chapter 2 provides a comprehensive review of the literature relevant to the current study. Chapter 3 addresses the research

methodology of the study, and Chapter 4 presents data and results. Finally, Chapter 5 consists of discussions and conclusions, including implications for social change and recommendations for further research.

Chapter 2: Literature Review

I conducted a thorough review of the literature to provide foundational knowledge related to novice teachers and DI. The purpose of this general, qualitative study was to explore how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. Current literature reflects that though academic, cultural, linguistic, and socioeconomic diversity continues to increase in classrooms, novice teachers are expected to meet the educational needs of all students (Decristan et al., 2017; Mockler, 2017; Schumacher et al., 2015; Teague & Swan, 2013). DI may facilitate meeting student needs, but novice teachers may not understand or be prepared to apply it appropriately (Bastian et al., 2017; Brevik et al., 2018; McLeskey et al., 2018; Teague & Swan, 2013). Understanding the perceptions of novice teachers about DI and how they use it can facilitate the academic growth of the diverse students found in classrooms today (Gaikhorst et al., 2017; Gaitas & Martins, 2017; Manship et al., 2016; Valiandes, 2015). This literature review helps clarify and explore the study's problem, which is a lack of understanding of the perceptions and application of DI by novice teachers.

In this chapter, I address seminal and current research related to DI and relevant to the research problem and purpose of the study. First, I describe the search process used to explore relevant research literature. Then, I describe the conceptual underpinnings of DI through a discussion of the works of Vygotsky (1978) and Tomlinson (2014). This description of the conceptual framework includes how Vygotsky's early theoretical propositions about children's cognitive development formed the basis for Tomlinson's practical applications of DI in the classroom. Finally, I review the current research

literature relevant to the broader problem. The review includes a discussion of (a) the importance of DI for diverse students, (b) the challenges of applying DI in the classroom, and (c) the readiness of novice teachers to apply DI in heterogeneous classrooms.

Literature Search Strategy

I conducted a literature search using a variety of resources to provide a comprehensive review. First, I utilized multiple databases within the Walden library system to identify current, relevant research. I selected terms associated with the study's purpose, problem, conceptual framework, and research questions to generate a large pool of articles for review. With the assistance of the Walden librarians, I started collectively with the databases Education Source, ERIC, and Academic Search Complete using the following keywords and combinations of keywords in Boolean searches: *differentiated instruction, differentiation, and individualized instruction, instructional method,* and *teaching method.* To explore the facets of the conceptual framework, I used the search terms *sociocultural theory, scaffolded instruction, student diversity, Vygotsky, zone of proximal development,* and *Tomlinson* to search the databases previously listed as well as these additional databases: Sage Journals and EBSCO Open Access Journals. To narrow the focus of the literature to the participant criteria, I then used the terms *novice teacher, beginning teacher, new teacher, elementary instruction,* and *primary instruction*. To locate statistics related to the field of education, I used the terms *race, socioeconomic*, *disability, language,* and *teacher experience* on the National Center for Educational Statistics website. Finally, to use the references of recent dissertations that pertained to my study, I used the terms *differentiated instruction, differentiation, scaffolded*

instruction, Vygotsky, zone of proximal development, and *Tomlinson* to search the Proquest Central database.

I also used Google Scholar to expand the search beyond Walden's resources for books and relevant articles published 5 years before this study's estimated publication date in 2020. I created Google Scholar Alerts using the terms *Tomlinson differentiated instruction* and *zone of proximal development* that delivered daily e-mails with links to recently published documents using those terms within the documents' keywords or abstracts. I also examined salient articles published before 2015 using the "cited by" feature of Google Scholar to locate more recent related studies. I reviewed the content and findings from the articles generated by the searches and alerts and analyzed them for relevance to the conceptual framework, problem, and purpose of the study.

Multiple books also provided relevant information, including seminal research written by or related to Vygotsky (1978) and Tomlinson (2014), to develop and support the study's conceptual framework. Further, though I used peer-review journals almost exclusively to collect current research for the literature review, several references are informal or opinion-based to provide insight into current trends and popular beliefs about DI and its use in the classroom.

Conceptual Framework

This study is grounded in the research of Vygotsky (1978) and Tomlinson (2014). Vygotsky's sociocultural theory holds that social interaction influences cognitive development and learning (Vygotsky, 1935). Vygotsky further described the relationship between child development and the process of learning as a simultaneous process.

Though other researchers of his time asserted that a child's level of cognitive development was the defining factor of what a child was ready to learn (Lourenço, 2012; Slavin, 2018), Vygotsky countered that when learning occurs, a child's cognitive development is augmented. The learning is effective when it occurs within a child's unique critical learning zone, the ZPD, and is scaffolded through interaction with others. Vygotsky's sociocultural theory supports the idea that learning should be both social and targeted to individual needs. Importantly, Vygotsky's foundational concepts are used prevalently by recent educational researchers, resulting in the development of instructional practices that reflect Vygotsky's concepts. It is this shift to the practical nature of sociocultural theory and the ZPD that necessitated a classroom model such as that of Tomlinson's model of DI.

In this study, I used Tomlinson's (2014) model of DI as a component of the conceptual framework. Developed in the 1990s, Tomlinson's model addressed student development like Vygotsky (1978); however, Tomlinson's research focused on meeting students' needs in a modern classroom setting. Tomlinson built on Vygotsky's sociocultural theory by providing a practical definition of DI and instructional guidelines suitable for teachers to use to meet students' unique needs in the classroom. Whereas Vygotsky addressed student learning through the lens of social psychology, Tomlinson did so through the lens of a modern educator.

Vygotsky's (1978) ZPD was selected to guide the study because it is a core tenet of DI in that it acknowledges the individual needs of students as they learn. Tomlinson's (2014) model of DI was selected to give structure to the study of novice teachers'

perceptions and applications of DI by providing clear definitions and descriptions of practical applications. Combined, the ideas of Vygotsky and Tomlinson guided this exploration of novice teachers' perceptions about DI. This discussion of the conceptual framework is divided into three sections. The first explains Vygotsky's concept of ZPD, and the second presents Tomlinson's model of DI. The third section discusses how the conceptual framework benefits the study.

Vygotsky's Concept of Zone of Proximal Development

Vygotsky (1978) proposed that the potential for cognitive development depends on learning that occurs within a cognitive range particular to each child called the ZPD. Through the concept of ZPD, Vygotsky asserted the importance of teaching and learning targeted to a child's needs. Instruction within the ZPD facilitates learning and therefore stimulates development, allowing the ZPD to shift and more complex learning to follow. Central to the concept of ZPD is social interaction. In the ZPD, children learn what is out of their reach when learning alone but within their reach with the help of a "more capable other" (Danish, Saleh, Andrade, & Bryan, 2017, p. 6). The role of the "other," often the teacher in a school setting, is to scaffold and support learning through interaction and instruction within the ZPD.

Vygotsky's (1978) concept of ZPD served as one part of this study's framework because the concept is prevalent in many theories and models of practice that have developed over time and are used in instructional decision making today. For example, Csikszentmihalyi's flow theory addressed engagement and motivation, including the necessity of appropriate challenges and supports to meet those challenges

(Csikszentmihalyi, Montijo, & Mouton, 2018). In their scaffolding process, D. Wood, Bruner, and Ross (1976) explored the role of a tutor in structuring interactions to assist a child in accomplishing a learning goal he or she would not be able to carry out without assistance. The educational system of Zankov (1977) included "teaching at an optimal level of difficulty" as a key principle (Guseva & Solomonovich, 2017, p. 778). Feuerstein's theory of mediated learning (Ben-Hur & Feuerstein, 2011; Kozulin & Presseisen, 1995) involved adult mediation in the structuring of learning events to increase student cognitive development. These learning theories all evolved from and extended the concept of ZPD.

It is important to note that researchers have also expanded interpretations of Vygotsky's (1978) theories to fit modern instructional environments. Participants with whom Vygotsky conducted research included children with visual and auditory disabilities as well as those with developmental disabilities (Vygodskaya, 1999). In modern classrooms, teachers, both novice and experienced, must make instructional decisions while considering physical disabilities and cognitive development at higher and lower levels as well as diversity of race, language, and SES. Additionally, Vygotsky conducted evaluations of individual students' cognitive development (Vygodskaya, 1999), whereas modern teachers must apply ZPD to classrooms with multiple children with unique characteristics. Student diversity has necessitated adaptations of the theory of ZPD to facilitate student learning.

Effective use of zone of proximal development through scaffolding in modern classrooms. Despite the range of diversity in educational settings, current researchers

have demonstrated that instruction scaffolded within a student's ZPD is effective in modern classrooms (Danish et al., 2017; Fung & Lui, 2016; Haider & Yasmin, 2015; Krashen, 1982; Macy, 2016). As such, ZPD is a powerful instructional strategy and one that novice teachers should understand and apply in their classrooms. Researchers have validated the use of ZPD in the classroom through multiple techniques that may not be familiar to novice teachers. For instance, Danish et al. (2017) explored the role of the ZPD in the cognitive development of early elementary students and found that with scaffolding provided by teacher questioning within the ZPD, students could demonstrate complex systems of thinking and reasoning. Following instruction about a honeybee hive's complex system, students in a control group were asked open-ended questions with little to no teacher prompting. In the experimental group, teachers posed the same questions but also provided prompts as a form of scaffolding to extend student thinking. The depth of the answers given by participants in the experimental group demonstrated deeper levels of understanding. The researchers established that instruction in the ZPD was able to increase student demonstration of complex thinking. Macy (2016) also described the effective use of ZPD in a case study of an elementary drama teacher who guided students through a dramatic reading and interpretation by using the ZPD to allow students to connect their background knowledge to new knowledge and to the knowledge of others. The teacher used language and movement to engage students and then adapted interactions with individual students as needed to scaffold learning. Macy asserted that this type of instruction designed by the teacher leads to the best learning in the ZPD. This highlights the crucial decision making required of teachers in diverse classrooms. Such

decision making is required of all teachers regardless of their level of experience and may be challenging for novice teachers.

Although scaffolding may be provided by a teacher, peers may also provide scaffolded interactions that contribute to DI. For example, Haider and Yasmin (2015) confirmed a statistically significant difference in the academic achievement of elementary students tutored by more knowledgeable peers compared to students who did not receive tutoring in English language classes. Fung and Lui (2016) documented similar results in an investigation of the differences between individual work and collaborative work in eighth-grade science classrooms, showing that collaborative groups performed the best, especially with a combination of student interaction and teacher guidance. The researchers described three levels of student performance. The lowest level was associated with whole-class teaching and asked students to solve problems independently. The two highest performance levels involved collaborative group work: self-directed group work and group work with teacher guidance. In the self-directed, collaborative groups, students interacted with each other to learn science concepts; in the collaborative groups with teacher guidance, students also worked together, but the teacher provided brief but timely interactions designed to focus students on critical concepts. Students in this group demonstrated the highest level of understanding of scientific concepts on unit post-tests. The researchers concluded that collaborative groups facilitated learning more than independent student work; however, student learning was enhanced more in collaborative groups with teacher scaffolded interactions than in collaborative groups without teacher input (Fung & Lui, 2016).

It is important to apply the concept of ZPD and scaffolding in modern classrooms to support student learning (Fung & Lui, 2016; Haider & Yasmin, 2015). But it is unclear if novice teachers understand the instructional technique of scaffolding and apply it in the classroom (Dack, 2019; Meeks et al., 2016). Because scaffolding is an aspect of DI, understanding what novice teachers know about effective scaffolding techniques and how they apply them in the classroom helps answer the research questions in the current study.

Social implications of zone of proximal development in modern classrooms. Novice teachers must consider the social aspects of learning that often are connected to instructional scaffolding, as learning occurs through interactions with others in a child's environment (Dias, 2019). Researchers have supported the social aspect of Vygotsky's (1978) theory by exploring the role social interaction plays in student learning. Krashen's (1982) research in second language acquisition reflected the importance of both the instructional and relational inputs in learning associated with Vygotsky's research. Krashen proposed that language learning is contingent on language that can be understood by the learner combined with language that is just beyond the understanding of the learner, which resembles Vygotsky's ZPD. However, Krashen also attributed second language acquisition to affective variables such as high motivation, self-confidence, and low anxiety, all within the influence of effective second language teachers through sociocultural interactions.

Zaretsky (2016) also interpreted the power of ZPD in social interaction, designing the reflection and activity approach using the ZPD as a core construct. The approach is a

system for facilitating learning through adult–child interactions and tasks matched to a child's individual learning needs, as described by Vygotsky. However, in the reflection and activity approach, Zaretsky emphasized the importance of deep, emotional bonds between children and teachers that allow for trust and enhanced learning as a result of the relationship. Social interaction increased children's self-confidence and willingness to work. Leaders of a summer camp program for students with learning disabilities implemented a reflection and activity approach, and Zaretsky attributed the success demonstrated by students in building academic skills as much to the emotionally supportive environment as to the appropriate individual level of instruction.

Similarly, Jones (2019) documented three elementary teachers' experiences in heterogeneous classrooms as they described their efforts to meet the unique needs of students. Although the researcher intended to explore how participants differentiated teaching strategies to meet students' academic needs, the teacher interviews and classroom observations presented an alternate focus. Participants described their efforts to meet students' individual emotional needs as well as individual cognitive needs; they all expressed that students' diverse emotional needs superseded academic success. The researcher concluded that a teacher's efforts to create positive, productive social relationships in a classroom were critical for supporting students' cognitive growth.

Additionally, Hedges and Cooper (2018) explored the role of social interaction and relationships in learning, describing teachers' skillful use of conversation with students to promote conceptual development through what they called "relational play-based pedagogy" (p. 370). The researchers observed early childhood teachers as they

interacted with children in a play setting with the goal of building conceptual knowledge by challenging ideas and thinking. One teacher joined a conversation with students who were drawing a house and garden. The teacher's relationship with and understanding of one child's interests and skills created the opportunity for the child to explore and expand her understanding of rain, gardens, and growing things. Another teacher decided to challenge one boy's conceptual knowledge of animals by gently presenting contradictory evidence to the child's understanding of the behavior of lions. Hedges and Cooper attributed the success of the interactions to the relationship between the teacher and student; more specifically, to the teachers' ability to relate to students' interests, value their input, and affirm their responses, while still challenging their thinking by asking questions.

Although research has focused on student development through teacher–student relationships, the relationship between students in a classroom also plays a role in Vygotsky's (1935) sociocultural theory. For example, Eun (2016) applied Vygotsky's theory to the education of ELLs, arguing for the importance of inclusive classrooms for ELLs to expose them to complex social interactions and relationships with diverse students and increased opportunities for learning. In these cases, other students served as the more knowledgeable individuals who supported ELLs with learning in the ZPD. Fernández, Mercer, Wegerif, and Rojas-Drummond (2015) also examined interactions between students who were relatively similar in cognitive development to see if these interactions would support student development, without input from a more knowledgeable other, when the answer to a problem or understanding of a concept was

not known in advance by any one group member. The researchers documented three types of speech interaction patterns between students working in collaborative groups: disputational talk, cumulative talk, and exploratory talk. Only the use of exploratory talk patterns, after they were explicitly taught to students, allowed them to develop a stronger understanding of problems and ways to solve them. Even without scaffolding designed by a teacher or tutor, students were able to expand their ZPD through interaction and collaboration.

As described in the research, academic scaffolding and sociocultural interactions are interrelated and support student learning yet may not be fully understood and applied by novice teachers. DI involves complicated, interrelated factors of instruction that may develop and strengthen over time for experienced teachers; however, novice teachers must also consider these factors for effective classroom instruction. Novice teachers need to understand how interactions such as those described by Krashen (1982), Zaretsky (2016), Hedges and Cooper (2018), Eun (2016), and others cultivate relationships that support student learning in the ZPD.

Zone of proximal development and technology. Through this study, I explored the perceptions of novice teachers in modern classrooms, so it was necessary to consider societal changes that have influenced modern interpretations of ZPD and sociocultural theory, specifically the role of technology in instruction. Vygotsky (1978) asserted that cognitive growth results from interactions between human individuals; however, Vygotsky did not have access to computers to support instruction so did not have the opportunity to consider if computer interaction was comparable to human interaction.

Consequently, it is important to note that technology has challenged teachers and researchers to redefine the way they interpret sociocultural theory in educational settings (Mattar, 2018; Yáñez, Okada, & Palau, 2015). As novice teachers make instructional decisions, technology will play a key role, and they should evaluate the use of technology considering Vygotsky's sociocultural theory.

Accordingly, teachers should evaluate the effective use of technology to support individualized instruction in the ZPD. Researchers, however, have documented mixed results in the ability of teachers using technology to do so. For example, Bahçeci and Gürol (2016) investigated the use of a web-based instruction system for software engineering students that provided individualized learning content based on a student's current level of knowledge. The researchers described the software's ability to imitate a human teacher in the complex task of providing instruction individualized for each student. In posttest results, the experimental group scored higher at a statistically significant level suggesting that teachers may use technology effectively to support learning in the ZPD. Xu and Warschauer (2019) found similar results in their evaluation of a conversational agent software program designed to interact with early elementary students during the reading of a storybook. The software program read the story to the child and asked scaffolded questions like those an adult would provide to a child who needed assistance during reading. They found that the conversational agent program engaged students and provided for adaptive conversation that differed with each child's language skills, demonstrating the concept of ZPD. The researchers did not evaluate the children's understanding of the story. However, they demonstrated the ability of

conversational agent software to act in the place of an engaging adult by documenting the software's ability to interact and respond to a child's developmental verbal skills in an instructional setting. These studies support the use of computers for individualized instruction to promote student learning.

Alternately, other researchers concluded that technology was not effective in increasing student achievement through DI. Tubman, Oztok, and Benachour (2016) did not find that technology acted effectively in place of interaction with a teacher. They considered the role sociocultural theory plays in the age of technology through an investigation of massive online open courses at the university level. The researchers examined interaction data such as comments, replies, and conversation length within online course platforms to determine the depth of learning. Although the researchers suggested that the potential for learning was strong due to extensive online interactivity and exposure to diverse points of view, the interactions they examined indicated only surface levels of learning. Thus, massive online open course platforms may not necessarily or appropriately reflect Vygotsky's (1978) social component of learning. Although online learning involves social interaction, this study suggested that merely participating in online communication does not ensure depth in learning. Because of these mixed results, teachers should carefully consider the instructional choices they make related to technology. While conducting this study, I sought to understand how novice teachers understand and apply DI to support student learning; this included the use of technology in the classroom. A strong understanding of ZPD and sociocultural theory will guide novice teachers in making instructional choices for their students.

Tomlinson's Model of Differentiated Instruction

In an exploration of novice teachers' understanding and application of DI, it is essential to understand Tomlinson's (2014) instructional model of DI, which operationalizes Vygotsky's (1978) theories within a classroom. The need for an instructional model is a result of the broad diversity and number of students in modern classrooms. Notably, Vygotsky's research addressed diversity in the cognitive function of children; however, he did not address additional categories of diversity encountered by teachers in many present-day Western classroom settings (Eun, 2016), such as linguistic, cultural, and socioeconomic differences. Tomlinson expanded on the concept of ZPD through the development of a classroom model of DI with these characteristics in mind. According to Tomlinson, DI includes instructional methods in which the process, content, and product of instruction are adapted based on a student's readiness to learn, learning profile, and interests. Clarifying these methods may help explore those with which novice teachers are familiar. Many instructional approaches incorporate elements of DI, such as project-based learning, experiential learning, small-group instruction, cooperative learning, independent study, and others. Through an understanding of Tomlinson's model, novice teachers can plan and adjust instruction using a variety of approaches so that students are within their ZPD, allowing for maximum learning.

Student characteristics and differentiated instruction. At the heart of DI is the consideration of unique student characteristics. In Tomlinson's (2014) model, these include a student's (a) readiness to learn, (b) interests, and (c) learning profile. Readiness is a consideration for student growth, interest is a factor in student motivation, and a

learning profile addresses efficient student learning. In a differentiated lesson, a teacher may adjust instruction based on one or more of these characteristics.

Readiness to learn. Readiness to learn refers to a student's ZPD for a given learning goal and allows teachers to determine appropriate levels of academic challenge. In any given instructional unit, a student may need adjustments to address gaps in understanding and background knowledge or to skip previously mastered skills; a student may need a faster or slower pace to accommodate the understanding of a concept depending on readiness (Tomlinson, 2014).

Ionescu (2019) described the concept in more detail with a sophisticated hierarchical pattern of learning that demonstrated the concept of readiness. As a child encounters a new concept, he or she progresses through three stages of readiness: variability, stability, and flexibility. This pattern is an extension of Vygotsky's (1978) ZPD in that it specifies different stages of learning to determine the best approach or intervention to ensure learning at that stage. Early in the development of a concept or process, a child experiences a state of variability in which he or she is unfamiliar with a concept and tries out different ways to solve a problem. Later, when the concept is in place, a child demonstrates stability by solving the problem or completing the process independently. Finally, a child develops flexibility and can apply knowledge of a concept or process to different problems or situations. In each stage, the child shows a different level of readiness, and a teacher can adapt instruction to encourage progression through the stages as a child is ready to do so.

Readiness can also be addressed through technology. Baron, Hogan, Schechter, Hook, and Brooke (2019) explored the concept of readiness in a quantitative study by evaluating a computer program designed to differentiate instruction for students with different categories of reading skills: poor decoder, poor comprehender, mixed deficit, and typical. Using technology-based literacy instruction, students participated in online lessons based on the initial assessment of reading strengths and needs, and the program adapted instruction as students indicated readiness for increasingly more challenging reading skills. The researchers found that personalized, technology-based instruction targeted to student readiness effectively improved reading skills. Through DI, a teacher might address a student's readiness by adapting instructional approaches through technology to meet the cognitive needs of students and ensure they are working in the appropriate ZPD.

Learning profile. DI allows a teacher to design instruction that addresses the cognitive growth and development described, and DI also addresses other facets of student diversity through learning profiles. A learning profile refers to the ways a student learns best and allows for efficiency in learning (Tomlinson, 2014). Tomlinson's (2014) model of DI addresses areas of diversity not present in the context of Vygotsky's (1935, 1978) research, such as racial, cultural, and linguistic differences, by considering a student's learning profile. Learning preferences, such as a quiet room versus a noisy room or a movement-friendly room versus a room where student positions are stationary, are part of learning profiles. Thinking styles are also part of a student's learning profile, such as a preference for creative or analytical problem solving (Alberta Education, 2010).

A student's culture, gender, background experiences, and prior knowledge all may shape his or her learning profile (Tomlinson, 2014).

Cultural factors in particular may influence a learning profile, such as whether a student is more comfortable in cooperative groupings or prefers independent work, whether a student thrives in competitive or cooperative learning situations, and whether a student is expressive or reserved in classroom interactions (Alberta Education, 2010). Dack and Tomlinson (2015) highlighted the potential for teachers to misinterpret the behaviors of students of different cultures as "disrespect, deficiency, defiance, or disinterest" (p. 11). They described instances in their research in which differences in teachers' cultural backgrounds from students created confusion about student learning. In Inuit Native American culture, for example, children are raised to learn by looking and listening in class, rather than speaking and interacting; a non-Inuit principal misinterpreted these behaviors and identified the students as having language and speech problems when, instead, the classroom behaviors were a result of preferred ways of learning (Dack & Tomlinson, 2015). Understanding learning profiles can help teachers avoid such misunderstandings, accommodate diversity in the classroom, and create efficient learning experiences for students.

Student interests. Student characteristics also include their interests, which play an important role in student motivation. Tapping into what students want to know stimulates curiosity and engagement in learning (Cress & Holm, 2016). Interests can be tied closely to culture, gender, background experiences, and prior knowledge, just as learning profiles may be (Tomlinson, 2014). A student may have skills in music that

connect to the concept of fractions in math; or a student may be motivated to read a story that makes connections to one from her cultural background; or a student with interest in medicine may choose to research how medicine has influenced different periods of history (Tomlinson, 2014). A student may want to create a solution to a problem in his community. While pursuing such topics of interest, learning becomes more enjoyable and sustainable.

In a study designed to investigate how a curricular program increased creativity in first graders, Cress and Holm (2016) found that when students were encouraged to pursue their interests during creative play, their engagement increased. When asked to reflect in writing about their experiences, students were motivated to communicate more effectively; the researchers attributed this motivation to the choice students were allowed and the authenticity of the learning experiences. They noted that although increased creativity was the focus of the program, students also made progress towards learning goals in writing. In older students, student interest is also a factor in motivation. Araneda, Guzmán, and Nussbaum (2019) acknowledged the importance of student choice as a factor of learning and explored how the national curriculum reflected the interests and motivations of high school students in Chile. Not surprisingly, they found that the subjects taught in the national curriculum most closely represented the interests of the students with the highest level of academic performance. The study conducted by Araneda et al. supported the idea that incorporating student interests into the curriculum enhances learning; teachers who include student interests while differentiating instruction foster engagement, motivation, and maximized learning in the classroom.

Through consideration of diverse student characteristics, including readiness, learning profile, and interests, a teacher using DI creates opportunities for all students to benefit from learning experiences (Tomlinson, 2014). Classroom teachers, including novices, can enhance student learning by understanding the characteristics of their students; yet it is unclear whether novice teachers consider student characteristics when planning instruction. Using Tomlinson's (2014) framework, I explored novice teachers' understanding of student characteristics and their use in differentiating instruction.

Instructional decision-making and differentiated instruction. To meet the needs of students, teachers need to consider their instructional decisions carefully. Tomlinson (2014) specified multiple methods for teachers to meet individual students' needs in the classroom through instructional decision making and incorporating student characteristics. These methods include the adjustment of the learning process, content, and product.

Learning process. Adjustments in process vary the way information is presented in a classroom setting and can range from whole-group instruction to individualized activities to flexible groupings of students for specific purposes. For example, a teacher might introduce graphic organizers in a whole group setting before then asking small groups of students to use them (Tomlinson, 2014). Then, the teacher may use tiered assignments with different groups, in which the learning objective is the same for all groups, but each group addresses tasks of varying complexity, as recommended by Harshbarger (2019). These adjustments in process support the varied learning needs of students.

Heterogeneous and interest-based groupings to support the learning process are discussed in current literature. In research that explored the use of small group instruction in inclusive classrooms in Finland, Sormunen, Juuti, and Lavonen (2019) noted the importance of teacher attention to establishing heterogeneous groupings of students in terms of cognitive ability while also grouping students with similar interests. The researchers found that carefully constructed groupings allowed teachers to provide support most effectively to students who needed it. Similarly, Fung and Lui (2016) found that cooperative group learning activities enhanced the cognitive growth of secondary science students. Another adjustment of process includes the way a teacher interacts with students to meet individual needs. Ionescu (2019), for example, described how teachers could support learning in each stage of variability, stability, and flexibility by varying the process of learning through interactions with the teacher. Students in the variability stage need exploration of a concept in context, along with guidance and instruction from a teacher, whereas students in the stability stage need the opportunity to practice applying skills and knowledge in typical contexts to understand a concept in depth. In the flexibility stage, teachers can present the newly acquired concepts in different contexts to allow students to extend and manipulate the concept under different circumstances. For each level, the ZPD is different and requires teachers to vary the process of learning accordingly. As a practical application in a large group of students, Ionescu recommended that teachers determine the ZPD of students and create three instructional groups, one group for students in each stage of the variability, stability, and flexibility, to adjust the learning process. Unlike in ability grouping or student tracking where groups

may be static and based on a single data point (Park & Datnow, 2017), this type of ZPD grouping is used as a strategy in Tomlinson's (2014) model of DI as one of multiple, flexible types of groupings within a heterogeneous classroom.

With DI, flexible groups are selected intentionally based on the potential for positive outcomes for students using a variety of factors, one of which is ZPD. A teacher using DI may group students homogeneously for individual skill acquisition, heterogeneously for cooperative learning among students with differing strengths, or with the purpose of balancing characteristics of behavior, social interaction, interests, and culture (Park & Datnow, 2017; Tomlinson, 2014). By doing so, teachers meet students' needs by adjusting the process through which students experience learning. However, varying the process of learning is only one form of differentiation.

Learning content. Adjustments in learning content involve the materials and subject matter that teachers use to meet student needs. Teachers may use text at various reading levels, materials based on student interests, or a variety of presentation modes, such as visual, auditory, or tactile (Gumpert & McConnell, 2019). Beyond those requirements, Tomlinson (2014) reflected that the materials used in class should be relevant to students' lives and reflect the things that are important to them. The materials should be engaging and should open students to ideas that show them their power and potential in the world around them. Tomlinson asserted that the most powerful subject matter is "dynamic, intellectually intriguing, and personal" (p. 53). Because students have varying characteristics, the materials to meet their needs may be different for each student.

Considering ways to increase student learning, Cox (2018) explored the ability of adapted text to support students' reading of primary historical documents. As some students exhibited difficulty with comprehension of the historical documents, Cox created homogeneous groups and presented text with lower Lexile levels to the students who were struggling. Students discussed the text with their group, and Cox noted that, though students in each group experienced challenges, they did not seem overwhelmed or disengaged. Cox used the students' discussions and answers to comprehension questions to conclude that the students in the case study benefitted from the adapted materials in the comprehension of the primary documents.

In addition to text level of difficulty, student interest is a factor in the adjustment of learning content. Both student choice and variety in content can play a role in student learning. In a phenomenological study, Kositsky (2016) described a secondary school in which students selected from content reading materials based on their interests. Students also related course content to song lyrics and works of art, expanding the traditional view of school literacy materials. Although Kositsky's research focused primarily on incorporating digital tools into the literacy classroom, the researcher provided insight into the way student choice can support student literacy as well. These research studies depict only a fraction of the possibilities teachers have in the adjustment of content to differentiate instruction in the classroom.

Learning products. Learning products are the way a student demonstrates knowledge or skill. Meeting student needs through the differentiation of product may entail allowing students to create a wide range of product formats, such as presentations

using technology, portfolios, rubrics, or peer evaluations (Gumpert & McConnell, 2019), in addition to more traditional forms of assessment, such as tests, quizzes, or essays. Cress and Holm (2016) described two types of learning products in a first-grade classroom. First, students created unique physical representations of artistic creativity, such as a sewing project, a model robot, or a photography portfolio. Teams of students worked to develop the physical product, then students individually reflected in writing on the creation process, with the writing serving as an additional product to demonstrate learning. McGee (2018) described the products of a first-grade science unit in which students created a model of the moon and completed moon journals to demonstrate content knowledge.

Learning products may not have a physical form, as described in previous examples. Instead, teachers may use observations or anecdotal records, such as in progress monitoring. Progress monitoring is an approach in which teachers may use learning products to inform DI, and its use has been found to improve academic performance (Hughes & Dexter, 2020). Progress monitoring involves learning progress assessments that are brief, easy to administer, used by teachers at regular intervals, and may be informal and formative in nature (Förster et al., 2018).

An example of a widely used progress monitoring program is RTI. RTI is a multi-tiered program used with students with a wide range of academic abilities that is designed to provide progressively more intense interventions as student learning difficulties become evident (Center on Response to Intervention, 2019). Bondie, Dahnke, and Zusho (2019) and Johnsen, Parker, and Farah (2015) described RTI interventions as very similar

to DI because they both serve to meet the needs of individual students. RTI does so through the use of formative assessments (RTI Action Network, 2019). These are often authentic assessments in the form of teacher observations or anecdotal records as students engage in attempts to demonstrate desired skills or knowledge (McCrary, Brown, Dyer-Sennette, & Morton, 2017). Another format of progress monitoring is curriculum-based measurement (CBM; Fuchs, 2017). Teachers use CBM with students who have identified learning disabilities. Both RTI and CBM use data from formative assessment collected over time to inform DI targeted to student needs. Progress monitoring programs such as RTI and CBM have been found effective for improving student performance.

Several researchers have demonstrated the efficacy of progress monitoring programs to increase student learning. For example, Förster et al. (2018) investigated student achievement in reading of elementary students in classrooms where progress monitoring was used. The researchers found that in classrooms where progress monitoring was used to guide instruction, students demonstrated higher levels of growth in reading fluency on standardized achievement tests than that of students in classrooms where progress monitoring was not used. In fact, Hughes and Dexter (2020) reviewed 16 field studies of RTI progress monitoring programs in a variety of settings with a variety of research methods. In all the studies, there was an improvement in academic performance that the researchers attributed to the influence of the progress monitoring approach. Progress monitoring tools such as CBM and RTI include informal, formative assessments as learning products through which a student demonstrates knowledge or

skill. These progress monitoring assessments and other types of learning products align with the DI model.

Although teachers need not differentiate every lesson by process, content, and product (Powell, 2016; Tomlinson, 2014), some researchers have explored instructional situations in which teachers have done so. Sentürk and Sari (2018) found that teachers in Turkey adjusted all three components, process, content, and product, to strengthen DI in the development of a science literacy curriculum. DI was evident in the use of learning centers and varied student groupings (process), materials with simpler or deeper text depending on student readiness (content), and assessment games, checklists, and peer and self-evaluation forms (product). The researchers found that students and teachers perceived that the adjustments in instruction improved science literacy levels of the students in their study.

In a study similar to the research of Sentürk and Sari (2018), Sormunen et al. (2019) described how teachers made adjustments in process, content, and assessment. First, teachers conducted a maker-centered project-based learning unit in an inclusive setting. Next, students were grouped heterogeneously for ability and homogeneously for shared interests. Additionally, teachers provided scaffolded support as needed while students worked in groups, and they conducted reflective discussions with teams throughout the project to support peer interaction. Finally, each student group used different manipulative materials and different uses of technology to create a product. Students designed and presented various projects to demonstrate mastery of unit objectives. The researchers noted that the project met the differentiation needs of students

of all ability levels and supported positive peer interaction in an inclusive setting. There are many documented methods of adjusting instruction for differing student needs; however, it is unknown if novice teachers understand or apply the adaptation of learning process, content, or product for students in the classroom.

Differentiated instruction as responsive teaching. Adding to the complexity of DI, many teachers find themselves in situations during instruction in which they need to consider individual student needs. As a practical application, it is important to acknowledge that DI requires spontaneous and creative action on the part of the teacher during instruction (Zaretsky, 2016). Tomlinson (2003), for example, used the term "responsive teaching" (p. 6) when describing DI to reflect the fluid and flexible nature of instruction as it addresses specific student needs. Jones (2019) expressed that DI is not just planning for individual and group differences but also responding to these student differences as they evolve in a classroom setting. Macy (2016) asserted that the "teacher as designer" (p. 6) must be responsive to learners' needs and make decisions during the process of learning, not just during planning. Ionescu (2019) referred to this as "just in time" (p. 2) direct instruction which occurs as a teacher is monitoring and determining the needs of students during the immediate process of learning. Each of these researchers acknowledged the need for teachers to act spontaneously and creatively.

Researchers have demonstrated that responsive teaching can positively influence student learning. This type of teaching was described by Reynolds and Goodwin (2016) in their research concerning effective tools for supporting students in reading complex texts. The researchers distinguished the difference between planned scaffolding, which

occurs during the planning of a lesson, and interactive scaffolding, which occurs as responsive in-person support as teachers and students interact. Reynolds and Goodwin found that the use of motivational interactive scaffolding predicted reading comprehension growth as measured by standardized tools. They cautioned, though, that the complexity of interactional scaffolding required teachers to learn to apply it effectively. In another study, Griffith (2017) documented the responsive decisions of pre-service teachers during fieldwork experiences and found that over 90% were able to describe instances of responsive teaching during which they used students' verbal and non-verbal cues to make immediate adjustments in instruction. The researcher acknowledged that the instances of responsive teaching were not always effective or based on strong pedagogical knowledge but noted that providing opportunities for these pre-service teachers to reflect on their instructional practices contributed to their professional growth. The ability to apply DI in a responsive, spontaneous manner is central to the success of the DI model.

To summarize, Tomlinson (2014) clarified that the complex nature of DI involves in-depth knowledge of a myriad of student characteristics and the ability to adjust for each student: (a) what is to be learned, (b) how it is to be learned, (c) and how the knowledge will be demonstrated. To make these adjustments, teachers should be able to create social situations that stimulate learning through scaffolding in teacher and peer interactions. Teachers need to plan for this process as well as make decisions in the moment to meet student needs. The complexity of the necessary knowledge and

responsive teaching process may present challenges for teachers, especially novice teachers who often lack the experience and skills of their professional peers.

How the Conceptual Framework Benefits the Study

The work of (1935, 1978) and Tomlinson (2014) including Vygotsky's sociocultural theory and ZPD, and Tomlinson's model of DI, are appropriate to serve as the conceptual framework for the current study and to provide structure and support to guide its implementation. The conceptual framework of this study informed and was informed by key study elements, including the problem, purpose, research questions, data collection, and data analysis. First, the conceptual framework aligns with both the problem and purpose of the study through clarification of the nature of DI. Because there is an insufficient understanding of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms, the purpose of this general qualitative study was to explore the phenomena. Although there are a variety of interpretations and applications of DI, the frameworks created by Vygotsky and Tomlinson provide clear definitions and guidelines for its application in the classroom. It is essential to clearly define DI to explore novice teachers' understanding of DI and how they apply it in the classroom. The conceptual framework focuses on the works of Vygotsky and Tomlinson to provide clear definitions and parameters for research.

The conceptual framework also benefits the study by informing the research questions and data collection. Whereas the research questions broadly address the problem and purpose of the study, the conceptual framework narrows the focus of the exploration to include novice teachers' consideration of DI as described by Vygotsky

(1978) and Tomlinson (2014). This approach is similar to a study conducted by Coubergs et al. (2017) who also used the DI constructs of Vygotsky and Tomlinson to explore novice teachers' perceptions of DI. The study conducted by Coubergs et al. supported the use of this conceptual framework in data collection.

Literature Review Related to Key Concepts

Although the concept of DI has a long history and well-established structure to support its use, there remain important issues to consider in current research related to DI. I discuss three key concepts in the following review of current literature: (a) the importance of DI for diverse students, (b) the challenges of applying DI, and (c) novice teachers' readiness for applying DI in the classroom. I selected these concepts because they were prominent in the review of studies concerning novice teachers and DI. Many current researchers have explored the use of DI with diverse student populations (Anthony & Hunter, 2017; Harshbarger, 2019; Kibler et al., 2019; Roberts, 2019; Tung et al., 2015; E. Turner et al., 2019; Wilcox, Lawson, & Angelis, 2015; Wolf, Magnuson, & Kimbro, 2017). Additional researchers have explored the difficulties for teachers at all levels of experience to apply DI (Baker & Harter, 2015; Dijkstra, Walraven, Mooij, & Kirschner, 2017; Gaitas & Martins, 2017; Kaur, Noman, & Awang-Hashim, 2019; Park & Datnow, 2017; Powell, 2016; van Geel et al., 2019; C. Wood, Wofford, & Hassinger, 2018), while some have focused solely on those of novice teachers (Gaikhorst et al., 2017; Hurlbut & Tunks, 2016; Meeks et al., 2016; Oakley, 2018). I also address controversy concerning the use of DI. Understanding these key concepts described in recent research provides a solid base of knowledge related to DI and novice teachers.

These key concepts also informed the purpose of the current study, which was to provide a deep understanding of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms.

Importance of Differentiated Instruction for Diverse Students

The steady increase of diverse students in U.S. classrooms (National Center for Education Statistics, 2019) necessitates instructional practices that incorporate the needs of such students. Much current research literature suggests that DI is an effective way to support learning for many student populations. Consequently, teachers, novice and experienced, need the knowledge and skills necessary to apply DI effectively and appropriately in diverse classrooms. Specifically, students who are diverse culturally, linguistically, socioeconomically, and cognitively may benefit from DI. Cultural diversity includes students with differing cultural norms and ethnic backgrounds. Linguistic diversity regards the contrast between the primary language students speak at home and the language of instruction in the classroom. Socioeconomic diversity is a factor of the income and level of education of students' caregivers. Cognitive diversity consists of students with differing abilities, ranging from students with special needs to those who excel academically. In the following sections, I discuss the role DI plays for students in each of these categories of diversity found in U.S. schools.

Culturally diverse students. There are multiple factors related to cultural diversity that may interfere with learning. For example, when students and teachers come from different cultural backgrounds than each other, the academic achievement of students may be adversely affected (Alsubaie, 2015). Variations in cultural norms can

make communication between teacher and student and from student-to-student challenging. For example, although some cultures prefer indirect and understated communication, this is in direct contrast with Western styles of communication, which are direct and frank (Alsubaie, 2015) and common in classrooms in the United States. These discrepancies in communication styles can make teaching and learning challenging. Students may feel uncomfortable with the format of instruction in a classroom, such as collaborative group interaction or individual active participation (Dack & Tomlinson, 2015). Further, different cultural norms may make teachers unable to effectively understand how and what students with different communications styles are learning.

Importantly, although students of all backgrounds benefit academically when schools are racially diverse (Ayscue, Frankenberg, & Siegel-Hawley, 2017), for some students, having a teacher of the same race positively influences academic success. Gershenson, Hart, Lindsay, and Papageorge (2017) found that for black male students, having a same-race teacher in primary grades had a long-term, positive, statistically significant impact on education, including test scores, attendance, and graduation rates. Unfortunately, the factor of same-race characteristic is often beyond the control of teachers assigned to diverse classrooms. However, the challenges of racial differences may be mitigated by a teacher's understanding of culturally responsive teaching, a form of DI that recognizes, values, and adapts instruction based on the cultural characteristics and norms of students (Dack & Tomlinson, 2015; Kimanen, Alisaari, & Kallioniemi, 2019).

Culturally responsive teaching. The origins of culturally responsive teaching can be found in critical race theory, which explores the complexities of race and its influence on social inequalities, has influenced school practice and policy (Howard & Navarro, 2016). Culturally responsive teaching has evolved to address the educational disparities identified by critical race theory (Bassey, 2016; Gay, 2018). Culturally responsive teaching includes many characteristics of DI, including building on cultural strengths, providing scaffolded support, adjusting curriculum, and establishing relationships with students (Lew & Nelson, 2016).

Differentiated instruction and the success of diverse students. DI in the form of culturally responsive teaching may play a role in the academic success of culturally diverse students. Current research supports the use of DI and underscores its importance for promoting the success of culturally diverse students at the classroom level. Cartledge, Susan, Bennett, Ramnath, and Council (2016) explored Dack and Tomlinson's (2015) idea of adapting classroom content for urban, minority students by providing culturally relevant materials written with student characteristics, backgrounds, and interests in mind. The researchers found that the students were engaged with the text; students recognized and pointed out their unique characteristics and interests in the text as they read. Dack and Tomlinson concluded that differentiating instruction by using texts that reflect the varied cultures and experiences of students at the classroom level was a decisive factor in student learning

DI also plays a role in the success of students with cultural diversity at the school and district levels. Wilcox et al. (2015), for example, investigated factors at the district,

school, and classroom levels that contributed to the achievement of schools with high concentrations of poverty and cultural diversity. The researchers compared 15 schools, 10 of which had a comparatively higher level of literacy achievement for diverse elementary students. They sought to identify the characteristics of the schools in which students were more successful in order to inform the practices of lower-performing schools. They specifically identified teacher practices as critical to student success. The higher-performing schools had teachers with high competency to differentiate instruction and adapt to the cultural characteristics of students. Teachers in lower-achieving schools reported low self-efficacy in differentiating instruction. Wilcox et al. established a connection between DI practices and the positive achievement of culturally diverse student populations. Tung et al. (2015) also found a connection between DI and academic success for culturally diverse students. They conducted a case study in which they examined the instructional practices of schools exhibiting academic success for Black and Latino males. They found that one common characteristic of the successful schools was the use of DI.

Conversations about race in the classroom. One possible deterrent to the success of culturally responsive teaching is the hesitation of White teachers to have discussions about race in the classroom, one component of the approach. In a study conducted by Milner (2017), teachers provided several reasons why they felt hesitation. First, they described pressure to teach curriculum tied to standardized testing, minimizing their opportunities to teach and talk about race. Second, they expressed concerns about the potential for a lack of support from parents and administrators about having such

conversations. Finally, although many teachers in their study expressed the importance of conversations about race within classrooms, most did not feel prepared to lead the conversations because of discomfort with the topic. Similarly, Kaldi, Govaris, and Filippatou (2018) found that teachers in Greece who were beginning their careers were "interculturally sensitive" (p. 13) but did not feel well-prepared to manage cultural diversity in the classroom, some because they did not want to call attention to differences in race. Avoidance of such discussion limits culturally responsive teaching.

Researchers have suggested ways to increase culturally responsive teaching by teachers who are hesitant. In a study by Coles-Ritchie and Smith (2017), the researchers found that both White and Black teachers of all levels of experience were unsure about how to discuss race with their students. The researchers conducted a year-long professional development program in an elementary school to provide teachers with a better understanding of how to talk about race with students. Although some participants, particularly White ones, were hesitant to participate in the training because of what they considered the "taboos of talking about race" (Coles-Ritchie & Smith, 2017, p. 182), most expressed that the training provided them with language and strategies to approach discussions about race in the classroom. Through these trainings, teachers were encouraged to use culturally responsive teaching and address academic inequities in the classroom.

Linguistically diverse students. Much research supports the assertion that linguistically diverse students, who are often also culturally diverse, similarly benefit from DI. Kibler et al. (2019) explored classrooms as places that hold opportunities to

create linguistically integrated student relationships that support high-quality educational experiences. Linguistically integrated classrooms are those in which there are peer relationships across students' language status. Kibler et al. compared the practices of teachers in classrooms that were linguistically high or improving over time with those that were linguistically low or decreasing over time. The researchers found that teachers in classrooms with high or increasing linguistic integration consistently used practices associated with effective DI, such as collaborative groupings, heterogeneous peer-scaffolded interactions, and responsive teaching. These teachers also used student profiles to guide classroom interactions by asking about and validating students' learning preferences, backgrounds, and experiences, thereby valuing student individuality. Kibler et al. demonstrated that teachers used DI practices to create environments where students experienced individual belonging and classroom community, both conducive to academic growth. E. Turner et al. (2019) also explored the ability of DI to meet the needs of linguistically diverse students by allowing them to communicate and demonstrate learning outcomes in a variety of ways. The researchers described the need for language learners in math classes to communicate with each other and with the teacher using a variety of scaffolds, including gestures, drawings, and written or spoken vocabulary in both a first and second language. These are examples of the adjustment of both process and product described in Tomlinson's (2014) DI model. Allowing alternate forms of communication in the classroom can facilitate and support learning experiences for students with linguistic diversity.

Socioeconomic diversity in the classroom. DI can support students in families

with low SES with the challenges they face in the classroom. Wolf et al. (2017) found family poverty to be an indicator of low kindergarten readiness skills. They found that children living in high poverty neighborhoods lacked access to early literacy programs and started school nearly a year behind in academic skills compared to children in low poverty neighborhoods. Netten, Luyten, Droop, and Verhoeven (2016) established that SES was a predictor of reading literacy achievement; they established that students' reading attitudes and reading self-concept were also predictors of reading achievement. They asserted that though SES is a condition that cannot be changed or influenced by educational settings, students' attitudes toward reading is a condition that can be improved by instructional decisions made in classrooms, such as those that are guided by DI. Further, Reynolds and Goodwin (2016) indicated a positive relationship between the interactional scaffolding component of DI and improved reading comprehension for this diverse group of students with low SES.

Additionally, DI is important not only for students from communities with lower SES. Roberts (2019) argued that when schools are socioeconomically diverse, all students reap academic rewards. Roberts asserted that the diversification of SES within a school and classroom increases the opportunity for all students to develop critical thinking and collaboration skills, both associated with academic achievement. Roberts attributed these opportunities to what he called the "diversity of perspectives" (2019, p. 26) that resulted from students being taught in heterogeneous environments.

Cognitive diversity in students. In addition to students with cultural, linguistic, and socioeconomic differences, students with cognitive learning differences, both those

who struggle in the classroom and those who excel, are likely to benefit when teachers use DI in their classrooms. Notably, Civitillo, Denessen, and Molenaar (2016) documented that cognitive ability was the characteristic most often used by teachers to determine the focus of DI. The characteristics of cultural background, interests, or personality were inconsistently addressed. The studies described in the following section demonstrate the wide variety of ways teachers have supported cognitive diversity through DI.

Harshbarger (2019) described tiered tasks that were designed to accommodate students' readiness to learn science content in a heterogeneous, elementary classroom. The researcher found that the students demonstrated engagement with tasks and were able to meet science content standards while completing tiered tasks within their ZPD. Gumpert and McConnell (2019) described an inquiry-based engineering design project in a heterogeneous, elementary classroom. During the project, teachers utilized multiple aspects of DI, such as providing texts within students' ZPD, varying the pacing of work, and providing manipulatives. The researchers used formative assessment at multiple points during the project so that they could adjust instruction according to students' needs. Based on their observations, they deemed the design-based engineering activity successful for all students. The use of DI in these classrooms met the cognitive needs of students who otherwise may not have been successful in understanding the concepts and completing the project.

Similarly, Cheeseman and Klooger (2018) proposed the use of heterogeneous groupings by ability to promote collaboration and the benefits achieved by social

interaction. Within these groupings, all students were initially assigned the same mathematical problem solving task and addressed the same learning goals; however, the teacher prepared prompts to both support and extend learning in the moment. To do so, teachers used such methods as adjusting the scope of the problem and using less complex examples and representations of the problem for students who needed support and extending the learning by presenting more complicated examples or tasks beyond the initial task and concept. Through DI, teachers can meet the needs of all students in a cognitively diverse classroom.

Challenges of Applying Differentiated Instruction in a Classroom

Although DI has great potential to meet individual student needs, its application in the classroom is often challenging for teachers at all levels of experience because it requires advanced instructional skills (Ionescu, 2019; Jones, 2019). This is evidenced in a study conducted by van Geel et al. (2019), who asked teachers considered experts in DI to provide a comprehensive hierarchy of skills to differentiate instruction effectively. The researchers offered this description of DI as a result of the study:

> It is clear that there is not one 'successful strategy' that can be applied to differentiate properly. The core of differentiation is in teachers' deliberate and adequate choices concerning instructional approaches and materials, based on well-considered goals and thorough analyses of students' achievement, progress, and instructional needs, combined with continuous monitoring during the lesson" (van Geel et al., 2019, pp. 60-61).

Baker and Harter (2015) also described the sophisticated thinking required of teachers as they facilitated student-centered pacing, alternative forms of assessment, and teacher-scaffolding at appropriate levels for different student groups. Ritzema, Deunk, and Bosker (2016) asserted that teachers must possess strong organizational skills to ensure that while students work in various configurations, perhaps cooperative groups, individually, or a small group with a teacher, they remain on-task. Powell (2016) acknowledged that DI, compared to traditional teaching methods, required more effort on the part of the teachers, including increased planning and preparation. These types of complex applications may be beyond the scope of novice teachers' abilities.

Looking back at the conceptual framework of the current study, Vygotsky (1978) and Tomlinson (2003, 2014) also spoke to the complexity of DI practices. To operationalize Vygotsky's theory of ZPD, teachers should be able to scaffold instruction and support learning through effective interaction (Danish et al., 2017; Fung & Lui, 2016; Haider & Yasmin, 2015), and Tomlinson (2003) described the complex and challenging nature of the responsive teaching component of DI. The complex nature of the skills and challenges associated with DI may leave novice teachers unable to apply it effectively.

Teacher perceptions of differentiated instruction. Teachers have shared their perception that DI is difficult or unattainable in their classrooms. This fact is salient because in a study of kindergarten teachers in the Netherlands, Dijkstra et al. (2017) established that teacher attitudes toward applying DI were a factor in its use in the classroom. A literature review conducted by Lavania and Nor (2020), for example, explored the hindrances teachers perceived in providing DI and found multiple themes:

student needs, curriculum, class size, time constraints, and preferred teaching styles. Gaitas and Martins (2017) looked specifically at the components of DI established by Tomlinson (2014) to clarify which elements were most challenging for teachers in Portugal. The teachers surveyed considered the adaptation of instruction based on students' abilities, interests, and learning profiles to be "very difficult." They also indicated that using assessment and scaffolded instruction to guide student progress was "very difficult" (Gaitas & Martins, 2017, p. 458). These studies demonstrated the difficulty of applying DI from teachers' perspectives and the multiple factors that contributed to their perceptions.

Teacher perceptions were also reflected in their willingness to use DI. According to C. Wood et al. (2018), more than half of teachers of ELLs expressed concerns about their ability to meet the needs of their students. This concern existed despite their willingness to use DI practices and their awareness of the importance of cultural and linguistic diversity. According to Rizzuto (2017), teacher participants reported that they felt ill-prepared to differentiate instruction for ELLs, although in this case, the teachers also felt that they should not be required to differentiate their instruction to meet the needs of students. Alternately, one study of note indicated that teachers did not perceive difficulty meeting the needs of diverse ELL students and that they were willing to adjust instruction to do so. Doran (2017) explored whether teachers' self-reported knowledge about effective instructional strategies for ELLs aligned with their professional development experiences. The researcher found that teachers reported participating in professional development that addressed effective methods for supporting students with

linguistic diversity and perceived that they were doing so. Yet, they were unable to demonstrate knowledge of critical instructional concepts such as inclusion and DI in mainstream classrooms.

In some cases, teachers expressed that, despite training, they did not plan to use DI. Callahan (Wu, 2017), described a grant program providing professional development to teachers over several years. Teachers in the study used DI during the programming but reported that they did not continue following the program's completion because they felt they did not have time, resources, or skills to proceed appropriately. In a small study conducted by Dack and Triplett (2019), although having extensive training in DI, two teachers expressed that because of the academically homogeneous characteristics of their students they did not think DI was necessary. This synthesis of current research indicates that teacher perceptions may inhibit the use of DI.

Outside influences affecting the practice of differentiated instruction. Sometimes factors outside of teacher control influence the use of DI in the classroom. Both Park and Datnow (2017) and Bondie et al. (2019) identified several outside influences that could alter a teacher's practice of DI both positively and negatively, including district policy, administrative policy, curriculum materials demands, and school culture. Not surprisingly, Park and Datnow found that in districts with a lack of specific policies to support DI, teachers generally fell back on traditional methods and materials for instruction. However, in districts that prioritized DI and provided extensive professional development and support, teachers participated more readily in DI. An additional outside factor was identified by Goldhaber, Krieg, and Theobald (2017). The

researchers determined that teachers who were hired in schools with different demographics than the schools in which they completed their student teaching assignments struggled with effective instructional practice. Another outside influence, the sorting and grouping of students, may often be determined by school leadership (Anthony & Hunter, 2017). Administrators may determine student placements with or without the input of teachers; the placements may create static homogeneous ability groupings or fluid heterogeneous groupings based on a variety of characteristics (Park & Datnow, 2017) impacting classroom instruction. Factors outside of the control of teachers may influence their instructional decisions and level of success in the classroom.

Assessment may also influence the use of DI. Spina (2019) described schools in Australia in which there was an emphasis on standardized assessment. In those schools, teachers were more likely to enact static ability grouping based solely on academic performance and data from standardized tests. Kaur et al. (2019) described a school in which teachers regularly used formative assessments to guide and adapt instruction based on student needs. However, the department heads designed summative assessments that consisted of traditional paper and pencil exams given to all students, with no adaptation of learning products that considered student characteristics. The teachers interviewed in the study indicated that the use of formal assessments may have resulted from pressure from administrators and parents who valued consistent, numerical data. These decisions made at levels higher in the educational system may affect what teachers do and are expected to do related to DI. Taken as a whole, outside influences, therefore, have the potential to hinder the use of DI

Novice Teachers and Differentiated Instruction

Definition of novice teacher. It is important to note that the definition of a novice teacher varies somewhat in the research studies included in the review of the literature that follows. In the current body of literature, researchers who studied teachers new to the profession referred to them as novices, beginning teachers, early career teachers, new teachers, and more. The timeframe during which a teacher fell into one of these categories varied from study to study, ranging from pre-service student teaching up to 5 years of teaching. Including literature that addressed a range and variety of contexts provided a depth of understanding of how recent research has explored the experiences of teachers new to the profession. For the current study, novice teacher participant criteria are defined more narrowly and will be discussed in detail in Chapter 3.

Novice teachers' readiness for differentiated instruction. In addition to the challenging aspects of DI that apply to all teachers, including student diversity, the complexity of DI, teacher perceptions of DI, and outside influences that affect DI, there are additional concerns for novice teachers. Novice teachers express that they do not feel prepared to use DI, they have not had time to develop skills in DI, and some novice teachers do not acknowledge the effective nature of DI.

Novice teachers indicate they do not feel prepared. Researchers have documented that novice teachers do not feel prepared to apply DI in the classroom. Gaikhorst et al. (2017) identified several categories of difficulties described by novice teachers in the Netherlands. First, in schools with students of lower SES, teachers were challenged by dealing with students and parents from different cultures or backgrounds.

Second, teachers in schools of varying levels of SES felt unprepared to adapt to differences in students' cognitive and language development. Finally, teachers in schools with students with high SES expressed an inability to address the academic needs of both high achievers and those at risk of academic failure. Notably, these categories are discussed in Tomlinson's (2014) model of DI.

Additional research identifies novice teachers' concerns about their preparation for DI. In Oakley's (2018) study, novice teachers in Australia reported that they did not have the pedagogical knowledge necessary for teaching spelling in a way that differentiated for student needs and, instead, used standardized commercial programs in a one-size-fits-all approach. In a study conducted by Hurlbut and Tunks (2016), pre-service teachers working in general education classrooms reported a lack of confidence in using RTI to assess and intervene in their future classrooms when students might require DI. Meeks et al. (2016) conducted a systematic review of the literature addressing pre-service teachers' preparedness to meet students' needs to support early literacy skills as they entered their first teaching placements. They found that novice teachers expressed low levels of confidence in meeting the needs of struggling readers, ELLs, and students with disabilities placed in mainstream classrooms. In an exploration of teachers' practices and experiences with DI, Brevik et al. (2018) also found that student teachers lacked the confidence and skills they needed in their first formal teaching experiences. In each of these studies, teachers expressed concerns about their ability to use DI effectively. Many novice teachers do not believe they are prepared to meet the diverse needs of students.

Lack of time to develop the knowledge and skills of differentiated instruction.

One challenge for novice teachers is a lack of time to develop knowledge and skills in DI. There is a correlation between years of teaching experience and student achievement, corroborating the idea that novice teachers may not yet understand or have the skills to apply DI in the classroom successfully. In a review of 30 studies analyzing the influence of teacher experience on student outcomes, Kini and Podolsky (2016) concluded that teachers with more years of experience could better support student learning. Similarly, Suprayogi et al. (2017) reported that teachers with less than 5 years of experience applied DI at significantly lower rates than those with 5 or more years of experience. Suprayogi asserted that it takes many years of experience for teachers to master complex pedagogical skills such as DI. This idea was supported by Mockler (2017), who stated that "classroom readiness is not a standard to be attained at graduation, but a process…over the course of a career" (p. 337). In fact, Pozas et al. (2019) deemed novice teachers "inherently unable" (p. 8) to use DI to teach diverse learners because they did not have the knowledge or experience. Research supports the idea that novice teachers have not had the time to develop pedagogical skills such as DI and, therefore, may not be ready to apply them in the classroom.

The continuum of teacher skill development. One concept to help explain why novice teachers have not had sufficient time to develop pedagogical skills and readiness for DI is a continuum of teacher learning about effective instructional practices, including DI. Many researchers and organizations have developed tools to document teacher growth along this continuum (McLean & Price, 2019; Staff Development for Educators, 2019; van der Lans, van de Grift, & van Veen, 2018). The fact that these tools exist, and

the descriptions of the stages of development through which teachers progress as they build effective practices, supports the idea that novice teachers may be at the early stages of learning and applying DI.

The tools used to evaluate teacher development have been described in multiple forms. Some researchers described the stages of teacher development and used these stages to evaluate teacher development. For example, Staff Development for Educators (2019) designed a continuum of DI practices for administrators to use in evaluating classroom teachers. Stages of implementation included early, intermediate, full, and advanced. The continuum described teachers in the early stage as having little, if any, experience with DI application. Van der Lans et. al (2018) also acknowledged cumulative teacher development. They established a scale of increasingly complex, effective teacher behaviors. They described three cumulative stages of development reflecting on what teachers focus in the classroom: (a) behaviors to create a safe learning environment, (b) efficient classroom management, and (c) quality in instruction, placing the use of DI in the final stage of development. Similarly, McLean and Price (2019) documented stages of novice teachers' professional identity over two years. The researchers described stages of development, beginning with the stage of idealism, followed by realism, and then independence. It was not until the final stage that novice teachers acknowledged student diversity and their role in meeting students' needs.

Another format addressing teacher development was a checklist of skills. Having identified the need of new teachers to understand DI, Subban and Round (2015) designed a DI checklist for pre-service and novice teachers to use when observing mentor teachers.

The researchers' goal in creating the checklist was to direct attention to the implementation of DI in the intuitive practices of mentor teachers, which may be missed by novice observers if not explicitly identified. Coubergs et al. (2017) also created a measurement tool called the Differentiated Instruction Questionnaire. Rather than directing teachers' attention to the practices of the mentors they observed, the researchers designed the measurement as a self-evaluation tool incorporating the DI model established by Tomlinson (2014). Coubergs et al. documented the measurement tool as a valid and reliable predictor of DI practices in the classroom; not surprisingly, increased understanding of DI concepts resulted in increased classroom application.

What these tools have in common is the suggestion that more time and experience for teachers may facilitate their understanding and application of DI and their growth along the continuum. The researchers who created the tools suggested that while novice teachers may not be competent in applying DI, they may develop competency with experience and training. Because novice teachers likely have less time and training in instructional practices than their more experienced peers, it is valuable to consider these continuums to clarify that teachers grow in their understanding and application of DI. There is a body of evidence suggesting that novice teachers may not be able to effectively apply DI in the classroom because they are at the beginning of a continuum of teacher learning.

Beliefs about the effectiveness of differentiated instruction. An additional challenge of applying DI for novice teachers is a lack of acknowledgment that DI is an effective instructional practice. Griffith (2017) noted that some novice teachers did not

recognize the need for responsive decision-making, a critical component of DI. The student teachers in Griffith's study expressed that they did not need DI because their lessons went precisely as planned, suggesting that the planning was the essential part of the lesson, not the responsive nature of the instruction. Dack and Triplett (2019) found similar misconceptions about DI among novice teachers. They examined two novice teachers' experiences, beginning with their teacher preparation programs continuing through their first two years of teaching. Following the completion of an in-depth course in DI, the students initially demonstrated knowledge and skills in the use of DI, and the students anticipated applying it with fidelity. However, after 2 years of teaching, they were not implementing DI and could no longer articulate their understanding of DI, as they had earlier. The teachers expressed that upon entering the classroom, they no longer considered DI to be an essential component of instruction. One of the novice teachers explained that he did not need to differentiate in his social studies classes because all his students were high achievers. The other novice teacher explained that because his students' test scores were high when he used traditional methods, he believed he could meet students' needs without using differentiation. With this thinking process, the novice teachers demonstrated a lack of necessary pedagogical knowledge of DI and a lack of readiness to apply DI effectively.

Controversy Related to the Use of Differentiated Instruction

Controversy about using differentiated instruction to address cognitive diversity. There is some controversy about the use of DI for students with cognitive diversity. Although Tomlinson (2014) recommended fluid groups in the classroom based

on various student characteristics, teachers or schools may sort students based on ability alone, placing students of similar skill levels in the same groups or classrooms. This sorting is controversial for several reasons. First, in classrooms where instruction is differentiated by ability only, students at the higher end of cognitive diversity may not receive DI in the classroom. Ritzema et al. (2016) found that weak students received more attention from their teachers than advanced students during whole-class, small-group, and individual instruction. Freedberg, Bondie, Zusho, and Allison (2019) noted that teachers spent more time focusing on less-able students, inhibiting the amount of time spent working with more capable students.

Further, larger-scale programs used to support struggling students may not be used to support students on the other end of the academic spectrum who require enrichment and advanced instruction to grow academically. Johnsen et al. (2015) discussed the use of RTI as a source of DI but noted that only 10 U.S. states expressly permitted students identified as gifted to be considered for RTI programs and interventions. Because few states specified the use of RTI to differentiate instruction for high achievers, it is unclear the extent to which this intervention has been used for such student populations. Wu (2017) recommended specific research focused on interventions for gifted students, asserting that just as interventions can support and maximize learning for learners who struggle, they can do the same for gifted students.

Conversely, when students are sorted heterogeneously by ability, other complications may arise. Freedberg et al. (2019) reported that when teachers created heterogeneous ability groups, highly able students often became frustrated and impatient

when working with less able students who needed more time to understand a concept, and teachers presented some students with work and expectations that were beyond their capabilities. Similarly, in a study conducted by Thorius and Graff (2018), teachers created student pairs with one higher-performing reader and one lower-performing reader. Although this format facilitated social learning as described by Vygotsky, it did not address the learning progression of higher-performing readers; in this model, only the lower performing member of the pair benefited from working with a more knowledgeable other within their ZPD. Essentially, half of the students did not receive DI based on their readiness to learn.

Studies addressing models for grouping students by ability are often contradictory. In an investigation of academic tracking of middle schoolers, Domina, McEachin, Penner, and Penner (2015) described one district's attempts to reduce homogeneous ability grouping in math classes. Instead of enrolling students in different math courses based on math skills, all students were enrolled in the more rigorous course with the belief that if all students were exposed to the same challenging content, achievement would increase for all students. Instead, many students with lower ability were not successful and had to repeat the course the following year. Similarly, teachers in the district described by Domina et al. disagreed about the appropriate model for sorting students. Some teachers expressed that higher-achieving students should be separated so that they would not have to deal with factors disrupting instruction, such as inappropriate behaviors. Others said, instead, that all students should be exposed to high-quality curriculum and instruction. The work of Domina et al. contradicted the research of

Cheeseman and Klooger (2018), whose model of DI effectively addressed the needs of a wide range of ability levels of students within one classroom without grouping students by ability. Cheeseman and Klooger suggested that it is not the grouping or lack of grouping that leads to students' success. Instead, they attributed the success of their model to the actions and the effective nature of the classroom teachers.

Studies that do not support differentiated instruction's effectiveness. Many studies have demonstrated the benefits of DI to support students' diverse characteristics and needs, whether cognitive, linguistic, cultural, or socioeconomic. However, a small number of researchers have not found evidence of its effectiveness in the classroom, particularly when DI was used with cognitively diverse students. Pablico, Diack, and Lawson (2017), for example, compared end-of-course test scores for experimental and control groups in high school biology courses and found that in the classes in which teachers applied DI, end-of-course scores were not significantly different from those with no DI. Förster et al. (2018) looked at the effect of using long-term assessment data combined with DI to improve reading skills in third graders. Students in the treatment group improved reading fluency skills; however, they did not improve comprehension skills, as hypothesized by the researchers. Faber, Glas, and Visscher (2018) also hypothesized that student performance in classrooms in the Netherlands where teachers used DI would be higher than in classrooms where DI was not used. They found, instead, that there were no positive effects of DI. In fact, for students in low-ability groups, performance was lower in the classrooms where teachers applied DI. However, studies that do not support the use of DI are a minority in the body of literature related to DI and,

frequently, only take cognitive diversity into account, rather than the various categories of diversity defined in Tomlinson's (2014) model of DI.

Current Research Related to the Research Approach and Research Questions

In the current study, Research Questions 1 and 2 focus on exploring the phenomena of novice teachers and DI through a qualitative approach. Although the review of current literature demonstrates the importance and challenges of the practice of DI, particularly as it relates to novice teachers, much of the research has been of a quantitative nature (Baron et al., 2019; Coubergs et al., 2017; Faber et al., 2018; Förster et al., 2018; Gaitas & Martins, 2017; Pablico et al., 2017; Reynolds & Goodwin, 2016). Coubergs et al. (2017), for example, designed a Likert-style self-reporting instrument to measure perceptions teachers have about DI. Such quantitative research allows for isolating variables and quantifying data (Burkholder et al., 2016). Yet, these quantitative researchers identified a further need for understanding the concept of DI with greater depth of description, as may be found in qualitative data. Analysis of these studies provides a rationale for research of a qualitative nature that explores the perceptions and experiences of novice teachers in the application of DI.

The research questions explore specifically novice teachers' perceptions and applications of DI. Much DI research has been related to teachers of all levels of experience, with less focus on novice teachers as a distinct group (Dijkstra et al., 2017; Doran, 2017; Ionescu, 2019; Jones, 2019; Powell, 2016; Ritzema et al., 2016). For example, Dijkstra et al. (2017) explored factors influencing the fidelity of a DI program but did not consider participants' teaching experience as a potential influence.

Alternately, Kini and Podolsky (2016) explored the effect of years of teaching experience on the quality of student learning but did not look at how that level of experience influenced perceptions about the practices that contributed to student learning. Because perceptions of DI may play a role in these levels of learning, Research Questions 1 and 2 explored how novice teachers, in particular, perceive and practice DI.

In the current study, Research Question 2 explores the instructional practices of novice teachers. Researchers studying the effectiveness of DI have often approached the topic by focusing on identifying and describing the school and classroom factors that support or complicate the practice of DI, rather than the role of teachers (Cartledge, Susan, Bennett, Ramnath, & Council, 2016; Gumpert & McConnell, 2019; Kini & Podolsky, 2016; Sormunen et al., 2019; Tung et al., 2015; Wilcox et al., 2015). When exploring teacher effectiveness, for example, Kini and Podolsky (2016) looked at the role of supportive work environments. Park and Datnow (2017) described district policies that interfered with DI application. Although researchers have used this approach to address the benefits and problems of the broad application of DI, the approach does not explore the specific ways teachers use DI to support students. Research Question 2 explores the applications of DI by novice teachers to address the gap in the literature.

Summary and Conclusions

The literature review shows a need for qualitative research concerning how novice teachers perceive and apply DI in heterogeneous classrooms. There is a strong base of research that documents the success of DI in increasing the academic achievement of diverse students, including those with varying cultural, linguistic,

socioeconomic, and cognitive characteristics (Cartledge et al., 2016; Reynolds & Goodwin, 2016; Tung et al., 2015; Wilcox et al., 2015). Most novice teachers find themselves teaching in classrooms which require DI because of the nature of student diversity (Carver-Thomas & Darling-Hammond, 2017). However, the application of DI can be challenging because it requires sophisticated thinking (Baker & Harter, 2015) and organizational skills (Ritzema et al., 2016) as well as the ability to adapt to student needs during the process of teaching and learning (Tomlinson, 2003).

Although it is clear DI encompasses effective instruction to meet the needs of diverse students and that DI is challenging to apply in the classroom, what is not known is how novice teachers perceive and apply DI. Little qualitative research has been conducted to explore these phenomena (Dack & Triplett, 2019). What research has been conducted has suggested that novice teachers may not be prepared to use DI or be successful in their attempts to use DI (Brevik et al., 2018; Dack, 2019; Griffith, 2017; Suprayogi et al., 2017).

The current study extends knowledge regarding the gap in practice of novice teachers' application of DI in kindergarten through fifth-grade heterogeneous classrooms by exploring the novice teachers' instructional practices related to DI. The current study addresses the gap in the literature about practice by focusing specifically on novice teachers and using a qualitative methodology to develop a deep, thorough understanding of the phenomena. Essentially, through this study, understanding how novice teachers perceive and apply DI may contribute to social change through the improvement in instructional practices of novice teachers and classroom success of diverse students.

In Chapter 3, I describe the design of the current study and the rationale for the selected design. I explain my role as the researcher and provide a thorough outline of the research process. I also provide information about data collection and data analysis and address the trustworthiness of the study.

Chapter 3: Research Method

This chapter provides an overview of the methodology of the current study. Qualitative research is used to explain people and their experiences in their everyday lives (Miles & Huberman, 1994). This task connects directly to the purpose of this study, which was to explore how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. In this chapter, I discuss the research design, a general qualitative approach, and a rationale for its use. The chapter continues with an explanation of my role as a researcher and potential biases that may result. Then, I describe the specific methodology to be employed, including participant selection, instrumentation, procedures for recruitment, participation, and data collection, followed by a data analysis plan. Finally, I address the trustworthiness of the study and the ethical procedures and practices that I utilized.

Research Design and Rationale

I used a general qualitative study to explore the following research questions:

1. What are novice teachers' perceptions about DI in their kindergarten through fifth-grade heterogeneous classrooms?
2. What instructional practices do novice teachers describe using to promote the success of their students in kindergarten through fifth-grade heterogeneous classrooms?

Central Phenomena

The central phenomena of this study are the perceptions and practices of DI by novice teachers in kindergarten through fifth-grade heterogeneous classrooms. These

perceptions and practices were explored through the lenses of Vygotsky's (1978) sociocultural theory of learning and development, specifically the concept of ZPD, and Tomlinson's (2014) model of DI for application in the classroom. I studied 12 novice teachers currently teaching in kindergarten through fifth-grade heterogeneous classrooms to explore these central phenomena.

Research Tradition and Rationale

A qualitative approach was appropriate to explore novice teachers' perceptions about the application of DI in kindergarten through fifth-grade heterogeneous classrooms. Qualitative research is used to understand the ways people view, experience, and make meaning of their world (Ravitch & Carl, 2016). Previous researchers have used a qualitative approach to investigate teachers' concerns and perceptions about DI. Zhukova (2018), for example, used a qualitative approach to explore novice teachers' concerns and experiences as they developed as teachers. W. D. Turner and Solis (2017) used a qualitative approach to understand instructors' perceptions and misconceptions about DI. Pilten (2016) also used a qualitative approach that included open-ended interview questions to study teachers' perceptions of DI and its applicability in their instructional setting. These researchers demonstrated the successful use of qualitative research to explore the perceptions of teachers, supporting the use of a qualitative approach in the current study.

More specifically, I employed a general qualitative approach. Sometimes referred to as traditional (Ravitch & Carl, 2016), generic (Caelli, Ray, & Mill, 2003), or qualitative description (Sandelowski, 2000), general qualitative is useful for an inquiry

into participants' perceptions associated with a real-world problem. It differs from other qualitative approaches such as case study, phenomenology, and grounded theory (Kahlke & Ba Hon, 2014). For example, in a case study, the researcher seeks to create a comprehensive picture of a phenomenon from a single instance or instances of phenomena bounded by a unit such as within a family or a school (Burkholder et al., 2016). In the current study, however, the sample was not bounded by a unit or setting. Instead, I pursued "broad insight" into the phenomena by using participants from various physical settings (Neergaard et al., 2009, p. 53). Additionally, although a case study may include a variety of data sources to support its trustworthiness, this general qualitative study employed only one source of data, interviews. But triangulation was accomplished by interviewing a wide range of individuals and comparing and contrasting their experiences (Sandelowski, 2000). This form of triangulation aligns with a general qualitative study and the problem and purpose of the current study.

Further, this study neither sought theory development, as in a grounded theory approach (Merriam & Tisdell, 2016), nor interpretive meaning of an experience, as in phenomenology (Neergaard et al., 2009). Rather, the purpose of the study was to explore how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms as framed by the work of Vygotsky (1978) and Tomlinson (2014). A broad representation of participants' experiences was reported using their everyday language (Neergaard et al., 2009) without the interpretation typical in phenomenology. A general qualitative approach provides a rich, straightforward description of the phenomena.

The general qualitative approach was compatible with the components of the current study. The research problem in the current study is an insufficient understanding of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. A general qualitative approach allowed me to approach this problem by exploring novice teachers' understandings and reflections on their experiences in their own words. Other researchers have addressed similar problems with a general qualitative approach (Askins, 2017; Fernandes, 2017). The use of a general qualitative approach was also a good fit with the conceptual framework. A general qualitative approach is appropriate when the researcher has prior knowledge about a topic (Percy et al., 2015). In the current study, the frameworks of Vygotsky (1978) and Tomlinson (2014) served as prior knowledge about DI that created categories of information to be explored, namely, sociocultural theory, ZPD, and the student characteristics, instructional decision-making, and responsive teaching components of DI. These categories, which stemmed from the conceptual framework, guided the interview protocol questions as well as the a priori codes used in data analysis. With a general qualitative approach, I explored participants' perspectives within the structures provided by the conceptual framework.

Role of the Researcher

I had no personal or professional connections with study participants. I served only as an observer in the research process, fulfilling the data collector's role during the interviews. Although there were no ethical issues associated with researching within my workplace or serving in a position of power over participants, there remained the

potential for researcher bias. During the process of conducting the interviews, recording the data, and performing data analysis, researcher bias may have influenced my actions and observations or participants' responses, unintentionally. The bias may have resulted if my perceptions about the research topic became evident to the participants or if I allowed my biases to influence the way I interpreted the data. I discuss strategies used to mitigate researcher bias in further detail in the following sections.

Researcher Background

My educational and professional backgrounds have shaped my beliefs about the concept of DI. I believe in the value and use of DI in heterogeneous, elementary classrooms. I served as a classroom teacher in Grades 2 through 8 for 14 years, practicing DI with greater proficiency over time. I then taught education courses at the community college level for 3 years, working with early career teachers on the theory and application of DI. I also served in the role of mentor to novice teachers at the middle school level, encouraging and demonstrating DI. I have read extensively about DI before and during this research process. These experiences have shaped my perceptions of DI, but it was important to be sure participants were not aware of these perceptions.

Mitigating Potential Bias

Because researcher bias can be a limitation to a qualitative study, I used several strategies to mitigate biases during data collection and analysis. Recognizing that the researcher is the primary data collection instrument of a qualitative study (Merriam & Tisdell, 2016; Ravitch & Carl, 2016), I designed the interview protocol with attention to minimizing researcher bias, which can occur when the characteristics of a researcher,

such as training, background, gender, ethnicity, or SES influence his or her interpretation of data by leading to subjective views on the study topic (Burkholder et al., 2016; Butin, 2010). These biases may become evident to participants during the data collection process. To minimize bias, I did not inhibit discussion or insight into participants' perceptions that varied from my own during the interview. I used neutral terms and impartial responses to participants' interview answers (Rubin & Rubin, 2012). Additionally, the physical presence as well as the wording used by the interviewer may influence responses (Burkholder et al., 2016; Ravitch & Carl, 2016), so I carefully avoided body posture or language that would indicate judgment, whether positive or negative, of the participant's responses. This addressed the potential challenge of prestige bias in which participants tend to give answers that they think are desirable to the researcher but may not be accurate (Thomas, 2017).

Researcher bias may also occur during the process of data analysis (Burkholder et al., 2016). For this reason, interviews were recorded and transcribed to preserve the original language and maintain the fidelity of the data (Ravitch & Carl, 2016). Interview transcripts were used as a basis for data analysis, rather than just researcher notes or memories, to minimize potential researcher bias (Rubin & Rubin, 2012). I also used member checking as a tool at multiple points to minimize bias during the interview and before completing data analysis (Burkholder et al., 2016; Ravitch & Carl, 2016); the member checking procedures are described in more detail in the Trustworthiness section. In the current study, strategies were in place within the interview protocol, during the interviews, and during data analysis stages to minimize researcher bias.

Methodology

Because the purpose of this study was to explore perceptions of novice teachers about DI, qualitative inquiry was an appropriate methodological approach. Specifically, I conducted this study using a general qualitative approach. Researchers conducting general qualitative studies stay close to the data collected to present a straightforward description of phenomena (Sandelowski, 2000). For this reason, I used one-on-one interviews to collect data directly from participants. I used their words from interview transcripts and analyzed the data with a priori codes to explore concepts connected to the conceptual framework as well as open and axial coding to develop additional themes that evolved during the analysis process. In the following sections, I describe details concerning participants, instrumentation, and data collection that align with a general qualitative approach.

Participant Selection

Participant population and sampling strategy. The population under consideration was novice teachers in the United States who taught in kindergarten through fifth-grade heterogeneous classrooms. Participants were recruited via Facebook and LinkedIn, with a focus on recruitment of those who followed education-related organizations on those sites. I also posted an invitation on the Walden University Participant Pool website. Because the goal of qualitative research, such as the current study, is to explore study elements rather than generalize to a target population (Daniel, 2012), purposive sampling strategies were appropriate (Burkholder et al., 2016). Although purposive sampling may result in a lack of accurate representation of a

population (Babbie, 2013; Burkholder et al., 2016), this sampling strategy was necessary to accommodate the time and resources available for the study and provide access to participants best able to address the current study's problem and purpose.

Participant criteria. Criteria were used to qualify participants to take part in the current study. Participants were required to be novice teachers in their first or second year of teaching in a kindergarten through fifth-grade heterogeneous setting. This level of teaching experience was required for two reasons. First, many school districts provide induction periods and support for novice teachers for at least 2 years (Goldrick, 2016). Second, many studies of novice teachers used participants in their first or second years of teaching (Flannery, 2017; Goldhaber et al., 2015; Hochberg et al., 2015; Martin, Buelow, & Hoffman, 2016; McLean & Price, 2019; Mitchell, Howard, Meetze-Hall, Hendrick, & Sandlin, 2017; Scales et al., 2017; Zhukova, 2018). Because it is important to build on the current body of literature (Perry & Nichols, 2015), the inclusion criteria aligned with that of earlier studies.

Participants were also required to hold a state certification in elementary education. Although some teachers begin teaching in a classroom with provisional certification, the criteria for the current study included only teachers with full certification at the time of the interview. Additionally, years of experience in the field included those years taught with provisional or full certification. Individuals who had taught for more than 2 years provisionally, regardless of current full certification, did not qualify. These criteria provided a baseline of pedagogical knowledge and consistency across the pool of participants. Participants had similar training and field experience and

had completed state-approved coursework (Daniel, 2012). The inclusion of these criteria increased the possibility of transferability to further research in settings that address a similar population (Perry & Nichols, 2015).

An additional consideration addressed was heterogeneity within the classrooms of participating teachers. A heterogeneous classroom is defined as one that consists of students with a wide range of cognitive, linguistic, cultural, and socioeconomic characteristics (Tomlinson, 2014). During the initial telephone conversation, participants described the students in their classroom using the categories included in the definition of heterogeneous classrooms, so they met the criteria. Other criteria were also confirmed by participants (Merriam & Tisdell, 2016). After participants were invited to participate and confirmed their interest to do so via e-mail, they confirmed the criteria that made them eligible during an initial telephone conversation; we then scheduled a date and time for a one-on-one interview.

Number of participants and rationale. The number of participants included in the current study was based on the goal of reaching data saturation. However, reaching saturation is complex. There are ethical concerns with both too large and too small samples, and a determination of data saturation can rarely be made before conducting research (Hennink, Kaiser, & Marconi, 2016). However, for the current study, I refer to the work of Hennink et al. (2016) who determined a sample size of seven-12 participants to reach saturation and Guest, Bunce, and Johnson (2006), who established a sample size of six-12 participants to reach data saturation for a thorough understanding of the issues in qualitative studies. The scope of the current study included 12 novice teachers. Similar

studies have also used between six and 12 participants (Allen, 2017; Askins, 2017; E. Turner et al., 2019). A sample size of 12 participants was appropriate for this qualitative study to obtain rich, in-depth data about teacher perceptions.

Procedures for participant identification, contact, and recruitment.

Participants were identified, contacted, and recruited through social media sites. I posted invitations to participate in the study on Facebook and LinkedIn and in the Walden Participant Pool. When a potential participant responded to the invitation, I offered him or her the opportunity to speak with me by telephone to further discuss the study details and confirm that they met the participant criteria. During the telephone conversation, following confirmation of selection criteria, I scheduled the interview. Finally, I sent a confirmation e-mail reviewing the interview details and providing my contact information and informed consent information.

Instrumentation

To accomplish the purpose of the study, I selected semistructured interviews as the data source. Interviews are often used in qualitative research seeking to understand participants' experiences with depth rather than breadth (Rubin & Rubin, 2012). The interview format was selected to collect detailed, contextualized descriptions of novice teachers' perceptions and experiences. During the interview, I served as the data collection instrument for the current study, using the interview protocol as a guide for the semistructured interviews (see Appendix A). In a semistructured interview, as opposed to a structured interview, the protocol guides but does not constrict the interviewer (Thomas, 2017). Therefore, in the semistructured interviews, I began with a list of

questions and topics to address but was flexible and asked probing questions to explore pertinent issues that evolved during the interview process (Thomas, 2017). With this data collection method, interviews were "adapted in real-time" (Ravitch & Carl, 2016, p. 5) to elicit rich, meaningful data. As recommended by Rubin and Rubin (2012), I developed the interview protocol with these characteristics in mind: (a) interview questions are broad and non-restrictive, giving participants the ability to respond in a wide variety of ways; (b) questions are balanced and as unbiased as possible, allowing for answers that reflect positive and negative perspectives, and do not reflect the researcher's understanding or beliefs about the research topic; and (c) the order of the questions is considered carefully with broader questions toward the beginning of the interview and narrower questions toward the end. In this way, questions were layered, with one question building on the next (Rubin & Rubin, 2012). Using this semistructured format, the data collected in this study assisted me in answering the research questions and accomplishing the purpose of the study.

I also designed the interview protocol with consideration of developing respect and trust between all parties. Participants were encouraged to speak openly, with the assurance that there were no right or wrong answers (Shenton, 2004). Rubin and Rubin (2012) suggested viewing interview participants as "conversational partners" (p. 74). This term emphasizes the role that both parties play in making meaning during the interview. I designed the protocol to invite conversational partners to educate me about the issue at hand. Because I asked participants to describe their experiences and perceptions, this request placed the interviewees in the role of expert and placed a high value on their

contributions (Rubin & Rubin, 2012). Pilten (2016) described this relationship between participant and researcher as an "environment of confidence" (p. 1428), which can be established by providing preliminary information about the study's purpose, the confidentiality of the participant and conclusions, and how the study's conclusions will be used. Developing trust and respect with participants allowed them to feel comfortable with the interview process, generating rich data for analysis.

Finally, the interview protocol was designed to gather the necessary information to answer the study's research questions with attention to content validity. Content validity refers to how closely a measurement tool measures the full extent of the concept under study (Babbie, 2013). I designed the interview protocol to address the key elements of the DI approach in alignment with the conceptual framework. To accomplish this, with the questions in the interview protocol, I asked novice teachers to consider their understanding and application of DI through the lenses of the ZPD described by Vygotsky (1978) and the model of DI designed by Tomlinson (2014). In the current study, each interview question corresponds with a study research question (Burkholder et al., 2016) as well as a construct described in the conceptual framework, to strengthen construct validity (Thomas, 2017). Researchers conducting similar studies exploring teachers' application of DI have also used Tomlinson's model to develop data collection tools (Brevik et al., 2018; Smets, 2017; Subban & Round, 2015). The structure and content of the interview protocol help assure content validity in the current study. See Appendix A for the interview protocol.

Procedures for Recruitment, Participation, and Data Collection

Participants were identified, contacted, and recruited through social media sites and the Walden Participant Pool. I posted invitations to participate in a one-on-one semistructured interview on these platforms. When novice teachers responded to the invitation on one of the social media sites, I offered the opportunity to have a short telephone conversation to discuss study details further and confirm that they met the study criteria. Once a potential participant was identified and the participant criteria were confirmed, I scheduled the interview. I then provided further information via e-mail. The e-mail to novice teachers reviewed details from the social media invitation about the purpose and significance of the study and the benefit to the teaching profession as a result of their participation and input. The e-mail included information about informed consent for participant review that also would be discussed with them later. I continued to schedule with qualified individuals until 12 interviews were scheduled. As soon as the first interview was scheduled and held, I began the data collection and analysis process; I did not wait until all interviews were scheduled to begin this process.

Informed consent. Informed consent, an ethical consideration in qualitative research, must be obtained from participants before data collection. Informed consent assures that participants understand that their participation in the study is voluntary and any potential consequences that may result for them (Merriam & Tisdell, 2016; Ravitch & Carl, 2016). In the current study, when interviews were scheduled, I provided participants with informed consent information for their review via e-mail, including a clear explanation of participants' rights in the voluntary study (Babbie, 2013). At the

beginning of each interview, I presented informed consent in writing again if necessary, and participants had the opportunity to ask any questions. Presenting the document to participants via e-mail and again at the time of the interview allowed adequate time for them to review the study and an opportunity for me to ensure they understood the consent process and implications, as required by the IRB. If a participant agreed to take part, I asked him or her to sign the informed consent, and the interview proceeded. Had a participant wished to exit the study at any time, he or she would have been permitted to do so without penalty; however, no participants requested this option. Obtaining informed consent from participants was necessary to ensure ethical practices and is described in more detail in the following section. I also describe additional ethical practices in more detail.

Data collection. The interview procedure was designed to maximize accurate data collection. One interview with each participant took place at a time convenient for the participant (McGrath, Palmgren, & Liljedahl, 2019) via Skype. Because the interviews were conducted online, I asked the participant to select a location and time for the Skype interview that would minimize distraction and provide privacy and confidentiality (Burkholder et al., 2016). Interviews lasted between 50 and 70 minutes. I recorded interviews simultaneously using both smartphone technology and Rev audio recording (Legare, 2019) through a laptop computer recording device. This duplication allowed for backup recording should one of the recording devices fail. This problem did not occur during any of the interviews. Following the interview, I thanked participants and provided them with an opportunity to ask any questions regarding the interview or

the study. Although there were no requirements for a follow-up meeting after the interview, I provided each participant with a summary of the preliminary findings as a form of member checking (Ravitch & Carl, 2016) to maximize data accuracy and increase the trustworthiness of the study's results (McGrath et al., 2019). This review allowed each participant to confirm that the findings were an accurate representation of their contributions and created an opportunity to make additions if needed. Finally, I offered to provide participants with the completed doctoral study upon publication, should they desire to review it. I discuss further information about member checking procedures and the trustworthiness of the study in detail in the following sections.

Data Analysis Plan

The data analysis plan for the current study was linked closely to the study's research questions. The data analysis process described lays out a deliberate process through which I sought answers to the study's research questions (Miles & Huberman, 1994; Ravitch & Carl, 2016), beginning with the interview protocol (see Appendix A). In the interview protocol, each question is connected to a facet of the conceptual framework. The conceptual framework informed the research questions, and the interview questions were derived from the conceptual framework. Each interview question is linked with a research question to create the alignment needed to answer the research questions. Although Questions 1 and 2 of the interview protocol are a broad introduction to the interview process, Questions 3 and 4 connect to Research Question 1, which focuses on novice teachers perceptions and understandings about student diversity and instructional practices to meet diverse students' needs, such as the instructional practices inherent in

DI. Interview Questions 5 through 10 connect to Research Question 2. These questions focused on exploring instructional practices participants reported that they designed and used to promote the success of the students in their classrooms. Finally, Questions 11 and 12 asked participants to synthesize the two research questions, describing the factors they perceived to impede or support their ability to promote their students' success. The semistructured interview format for data collection was a good fit with the research questions because it generated in-depth accounts of participants' experiences and perceptions (Percy et al., 2015).

The literature review also contributed to the formation of the research questions and the interview questions. Current literature documents the importance of using DI with diverse students (Reynolds & Goodwin, 2016; Tung et al., 2015; Wilcox et al., 2015) and the challenges teachers may have in its classroom application, particularly novice teachers (Brevik et al., 2018; Suprayogi et al., 2017). Through the interview questions aligned with these concepts, I sought to deepen the knowledge about novice teachers' perceptions and applications of DI and explore how the current study's findings related to previous research findings. Because of the alignment between the interview questions, the research questions, the conceptual framework, and the current research, the interviews provided the data necessary to answer the following research questions (Burkholder et al., 2016; Thomas, 2017):

1. What are novice teachers' perceptions about DI in their kindergarten through fifth-grade heterogeneous classrooms?

2. What instructional practices do novice teachers describe using to promote the success of their students in kindergarten through fifth-grade heterogeneous classrooms?

As in the research of Whaley (2019) and Piper (2019), the research questions and conceptual framework guided the study and provided a lens through which data were analyzed. Next, I describe additional aspects of the analysis plan, including the coding and data analysis processes, data management, and how discrepant cases in the data were addressed.

Data analysis process. In the current study, I used a general qualitative approach to guide the data collection and analysis process. As Merriam and Tisdell (2016) advised, I conducted data collection and analysis simultaneously to allow for emergent insights and a developing understanding of the phenomena under study, as is desirable in qualitative research. The first phase of data collection and analysis began with the first participant interview. During the interview, I used a paper copy of the interview protocol to guide the interview. I directed my attention to the participant by making eye contact and asking clarification questions to encourage the participant to share valuable insights in depth. Following each interview, I allowed for a period of reflective journal writing. In the journal, I expanded upon and narrated the thoughts and observations I made during the interview, drawing connections between the data, the conceptual framework, and the research questions (Ravitch & Carl, 2016). I used the qualitative data collected in each interview transcript, my interview notes, and my reflective journaling in the data analysis process.

The data collection and analysis process continued with each successive interview. Because Merriam and Tisdell (2016) recommended beginning data analysis early, I sent data collected during each interview to a transcription service within 24 hours ("Audio transcription made simple," 2019). The service provided human-generated transcripts within 24 hours. Reviewing transcripts soon after the interview increases accuracy in the analysis (McGrath et al., 2019; Rubin & Rubin, 2012). Therefore, upon the return of each transcript, I reviewed the transcript within 24 hours, comparing the audio version to the transcript, looking for inconsistencies or places where the text was inaccurate. I made the corrections manually, maintaining fidelity to the words of the participant. After reviewing each transcript, I uploaded the transcript and interview notes into the NVivo ("What is NVivo?," 2019) software platform for analysis, which I describe in greater detail in the Data Management section. During data analysis, and using the NVivo software, I incorporated content analysis using six analytic strategies recommended for general qualitative research by Miles and Huberman (1994) and summarized by Neergaard et al. (2009):

1. Coding of data from notes, observations, or interviews
2. Recording insights and reflections on the data
3. Sorting through the data to identify similar phrases, patterns, themes, sequences, and important features
4. Looking for commonalities and differences among the data and extracting them for further consideration and analysis

5. Gradually deciding on a small group of generalizations that hold true for the data
6. Examining these generalizations in the light of existing knowledge (p. 54)

As recommended by Merriam and Tisdell, these strategies were recursive and continued throughout data collection and analysis, using the NVivo software to facilitate the process.

Data management for coding and analysis. An essential component of data analysis is the organization and management of data (Merriam & Tisdell, 2016). I used several strategies to organize and manage data. First, as the interviews were held, I labeled interview notes and transcripts with a confidential identifier for each participant. For example, I assigned a unique number to each participant: Participant 1, Participant 2, Participant 3, etc. To organize the raw interview data, I used a coding process to identify and organize key elements of the data pertinent to the study, including a priori, open, and axial coding. Codes are words or phrases that capture the essence of data for use during the data analysis process (Merriam & Tisdell, 2016). In the current study, the key elements of DI, as defined by the works of Vygotsky (1978) and Tomlinson (2014) and described in the conceptual framework, provided the source for a priori codes. Through these codes, I categorized data deductively. Next, during open coding, I did not use pre-determined codes. Instead, words and phrases of meaning that emerged from the data that were repetitive or expressed emphatically (Ravitch & Carl, 2016) or that were relevant to the study (Merriam & Tisdell, 2016) were collected and designated as codes (Burkholder et al., 2016). These open codes changed and evolved inductively during the data analysis

process (Saldana, 2016). During the final coding, axial coding, I grouped codes into categories to better identify patterns and, eventually, major themes (Saldana, 2016). The organized codes and themes formed the basis for the findings and conclusions of the study (Merriam & Tisdell, 2016).

I used qualitative data analysis software to assist with data management. Specifically, I utilized NVivo ("What is NVivo?," 2019) software for data preparation, data identification, and data manipulation (Merriam & Tisdell, 2016). NVivo software is designed to assist researchers with the organization of and access to coded content. Although NVivo can assist with the development of codes and themes and the presentation of findings in meaningful ways, all steps of the analysis process were dependent upon researcher input, decision making, and evaluation. The NVivo program assisted as I organized the data using both structured a priori codes and emergent codes. I entered the a priori codes into the software program manually, then the program's software tools helped me identify and assign inductive, emergent codes. These codes were developed by comparing and contrasting participants' interview responses and identifying unanticipated topics of interest that evolved as the interviews proceed (McGrath et al., 2019). Software programs can be useful for this purpose because they can organize large amounts of data and assist with assigning codes to segments of data (Merriam & Tisdell, 2016). The use of software simplified the analysis process without sacrificing the data's meaning (Merriam & Tisdell, 2016).

Data management also includes proper data storage. Proper storage is essential to prevent data loss (Merriam & Tisdell, 2016), so I used several storage locations.

Interview transcripts are stored on an external hard drive and in cloud storage, and a hard copy was printed and stored in a location separate from the hard drive. For the current study, I used NVivo ("What is NVivo?," 2019) software to aid data storage. Software data are stored on my password-protected computer within the software program and backed up to an external hard drive. NVivo software assisted with all aspects of data management.

Discrepant cases. In some instances, collected data may appear different or discrepant from the patterns or developing themes. Saldana (2016) recommended that researchers look for patterns but not discard the insight that may come from exploring the reason for codes indicating ambiguity. Discrepant cases are an opportunity to challenge interpretations, develop a well-rounded understanding of the phenomena under study, and strengthen study validity (Ravitch & Carl, 2016). Any discrepant data found when analyzing interviews and researcher notes have been shared transparently in the data analysis and findings of the current study.

Trustworthiness

Many procedures established a high level of trustworthiness in the study. In qualitative research, quality and rigor are determined by a study's trustworthiness (Golafshani, 2003; Shenton, 2004). The concept of trustworthiness reflects a qualitative researcher's goal of establishing confidence in a study's findings (Lincoln & Guba, 1985). I established trustworthiness in this investigation by using four standards: (a) credibility, (b) transferability, (c) dependability, and (d) confirmability (Lincoln & Guba,

1985). I describe these procedures and additional procedures I used for each standard of trustworthiness next.

Credibility

A credible study is one in which the research process enables the researcher to answer the intended questions. Because of this, credibility is connected closely to the research design, instruments, and data (Ravitch & Carl, 2016). In the current study, the alignment of the problem, purpose, conceptual framework, research questions, interview protocol, and coding process helped establish credibility. Also, I used member checking to ensure the data collected were aligned with the participants' intentions (Burkholder et al., 2016). If needed, I asked questions during interviews to clarify that my understandings were in line with participants' intended meanings (Lincoln & Guba, 1985). Further, after initial data analysis, I provided participants with a summary of the study's preliminary findings for their review, thereby supporting the study's credibility. This review took place before the final stages of analysis and reporting so that any clarifications or additions could be reflected in the study's findings. Thick description, including the use of the words of participants within the data set, as well as the context in which they were spoken, also supports the credibility of the study (Ravitch & Carl, 2016). As a component of thick description, any discrepant cases were thoroughly related and addressed in the data analysis section of the current study (Ravitch & Carl, 2016). These strategies facilitated credible answers to the research questions of the current study.

Credibility is also established when strategies are in place to encourage honest answers from participants (Shenton, 2004). In the current study, the informed consent process provided that only those willing to participate were included, and participants were ensured that their confidentiality would be maintained (Babbie, 2013) through multiple measures, as described in the ethical procedures section. No one will know who participated in the study or what information was shared, allowing participants to provide candid answers. I designed the interview protocol to gain honest answers from participants by setting at ease concerns about the researcher's role as an expert and assuring participants that there were no right or wrong answers (Burkholder et al., 2016). Interview questions were neutral in nature so that they did not indicate that there was one answer that was more desirable over others. I assured participants that there was no judgment as a result of their answers. Instead, by providing honest answers, I ensured participants they would be supporting the credibility of the study and providing potential benefits to the field of education. By viewing participants as partners in the interview process, I validated their contributions and create an atmosphere of trust necessary for open and honest interview responses (Rubin & Rubin, 2012).

Another source of credibility is triangulation, a practice supported by many researchers (Merriam & Tisdell, 2016; Ravitch & Carl, 2016; Shenton, 2004). I used the triangulation strategy described by Shenton (2004), in which the researcher uses a wide range of informants. I explored the viewpoints and experiences of informants in comparable positions to form a rich description (Shenton, 2004) of novice teachers' perceptions and classroom experiences. Adherence to the research plan, including

research design, interview protocol, and data analysis process, as well as the inclusion of transcripts of data collected in the interview, built the credibility of the current study.

Finally, credibility is supported using reflexive practices. In the current study, I kept a reflexive journal to document my reflections, questions, and ideas and how they changed throughout the study. As the primary instrument for data collection in qualitative research, a researcher will inherently influence the data collection and analysis (Babbie, 2013; Ravitch & Carl, 2016). A reflexive journal allowed me to acknowledge my positionality in relation to the participants and describe my biases and assumptions related to the topic of the study (Merriam & Tisdell, 2016). Reflexivity was an opportunity to describe how my experiences may have influenced the way participants responded to me, the ways I may have interpreted their contributions during our interactions, and the potential those interactions had to influence the study's results (Merriam & Tisdell, 2016).

Transferability

Transferability refers to the ability of a study's findings to apply in different settings and contexts (Ravitch & Carl, 2016). To strengthen the transferability of qualitative research, I describe the data and context in rich detail in the Results section, providing as much information as possible (Merriam & Tisdell, 2016). This level of detail allows readers to decide whether the contextual factors are enough like other settings that the findings may be applied or transferred to those settings. Here, thick description within the data set provides details and context necessary to support the transferability of the current study (Merriam & Tisdell, 2016). Also, I describe the

context of the setting and participants in the analysis and findings sections of the study so that future researchers may apply the findings to their unique contextual setting.

Dependability

Dependability within a study refers to the stability of results over time (Burkholder et al., 2016; Golafshani, 2003). As with the characteristic of credibility, I established dependability through a strong research design (Ravitch & Carl, 2016; Shenton, 2004). In the current study, the alignment of the research components, as well as the rationale for their selection, served this purpose. The alignment addressed dependability by ensuring that the data addressed the research questions. Also, as with the characteristic of credibility, triangulation built the study's dependability (Merriam & Tisdell, 2016; Ravitch & Carl, 2016). Dependability was also strengthened through full disclosure and transparency in the description of how decisions were made regarding processes of data collection, transcription, and analysis (Ravitch & Carl, 2016). This transparency was accomplished through reflexive journaling throughout the research process. Finally, my committee's guidance facilitated dependability by providing an inquiry audit designed to evaluate the study's conclusions to confirm that they were supported by the data (Lincoln & Guba, 1985).

Confirmability

Confirmability involves establishing a measure of objectivity in research. Although qualitative researchers acknowledge that qualitative research, by its nature, cannot be objective (Ravitch & Carl, 2016), one way to establish confirmability is by having a researcher document attempts to maintain his or her role in the research as

neutral and as bias-free as possible (Burkholder et al., 2016). To this end, I kept a reflexive journal throughout the data collection, analysis, and interpretation process. This journal helped explore potential researcher biases and mitigate them, however possible (Amankwaa, 2016). Any unmitigated biases are described in the study's findings to provide transparency in the measurement of objectivity. The reflexive journal assisted in the creation of an audit trail (Burkholder et al., 2016). Like a reflexive journal, an audit trail served to document how the study was conducted and how decisions were made. However, in the case of the audit trail, the purpose was to present these details so that readers could follow the researcher's decisions and steps to understand how the findings were derived from the data, also supporting the study's confirmability (Merriam & Tisdell, 2016).

Ethical Procedures

I engaged in several steps to ensure the current study was conducted ethically. Conducting research ethically includes the concept of informed consent. Informed consent requires that research participation be voluntary and that no harm should come to participants as a result of their cooperation (Babbie, 2013; Burkholder et al., 2016). In the current study, participation was voluntary, and participants were reminded of this at multiple steps along the way, before and during the research process; they could withdraw at any time without penalty. I asked participants in the study to sign an informed consent form, indicating such understanding, before the interview to mitigate ethical research concerns. I obtained, as required, approval to conduct the study from

Walden University's IRB. The IRB approval number for this study is 04-27-20-0314597. The informed consent included this IRB information.

An additional ethical concern is any harm that may come to research participants when their confidentiality is not maintained (Ravitch & Carl, 2016). Harm to participants could occur during the recruitment process if participation were known to those who supervised them. In the current study, participants' names, identities, and contact information remain confidential. I assigned a reference designation to each informant. Audio recordings and transcription files are kept securely in a password-protected external hard drive. Hard copies of documents do not include identifying information and are kept in a locked drawer. After 5 years, I will shred the hard copies of any documents, and I will format the drive containing digital data to ensure that all data have been deleted. These precautions ensured participants' confidentiality during recruitment and data collection and after the completion of the study so that no harm will come to them.

Summary

In this chapter, I outlined the procedures I followed to effectively answer the research questions of the current study through a general qualitative approach. These procedures included detailed descriptions of participant selection, instrumentation, and procedures for data collection. Further, I described a plan for data analysis. I also addressed issues related to the trustworthiness and ethical procedures for the study. In Chapter 4, after a thorough analysis of the collected data, I present the study's findings.

Chapter 4: Results

The purpose of this general qualitative study was to explore how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. The goal of developing a deeper understanding of these phenomena stemmed from a gap in the literature and a gap in practice that suggested novice teachers do not demonstrate effective DI practices that are supported by current research literature to promote student success. To address this goal, the research questions that follow guided this study:

1. What are novice teachers' perceptions about DI in their kindergarten through fifth-grade heterogeneous classrooms?
2. What instructional practices do novice teachers describe using to promote the success of their students in kindergarten through fifth-grade heterogeneous classrooms?

In Chapter 4, I present the findings of the study resulting from data collection and analysis. This chapter describes the process used to establish the results of the study, including a description of the setting, the steps of data collection, and a detailed report of the data analysis process. The results of the study follow, organized by findings to address each research question. Finally, I present evidence of the study's trustworthiness and a summary of the chapter contents.

Setting

Several conditions characterized the setting of the study, which varied from the original research plan. Following conditional IRB approval to recruit participants from a local school district, an international health crisis prompted the closure of schools. As a

result, I used an approved secondary plan to recruit participants through the social media platforms of LinkedIn and Facebook. However, the change in the recruitment source of participants did not compromise the trustworthiness of the study. As described, the participant sample was not intended to be bounded by a unit or setting. Instead, as is common in general qualitative studies, the goal was "broad insight" into the phenomena using participants from a variety of physical settings (Neergaard et al., 2009, p. 53; Sandelowski, 2000). The large school district was initially selected to provide this characteristic, but the social media outlets provided a variety of physical settings as well. There were no other variations from the plan presented in Chapter 3.

The 12 participants in the study held the common characteristics of being certified, novice teachers in heterogeneous K-5 classrooms. Four taught kindergarten, two taught first grade, two taught second grade, one taught third grade, and two taught fifth grade. The mix of first and second-year teachers was almost even, with seven of 12 teachers having 2 years of teaching experience. All but one of the teachers were female. Participants taught in various states, including Maryland, Ohio, New York, Georgia, and the District of Columbia, including both urban and suburban areas. Most teachers taught in Maryland; however, their schools were in a variety of cities. Through these characteristics, participants met the study's requirements (see Table 1). It is also important to note that all the participants in the study were White. The race of participants was unknown when they volunteered for the study as all communications before the interview were via e-mail and telephone, and I did not ask participants their race when I discussed participant criteria. In addition, all but one of the schools in which

participants taught were public schools. These were not intentional factors in participant selection, although they may have influenced the results of the study.

Table 1

Participant Demographics

Participant #	Grade	Years of Teaching	State	Gender	Geographic Characteristic	Type of School
1	1st	2	DC	F	Urban	Public
2	K	2	MD	F	Suburban	Public
3	3rd	1	MD	M	Suburban	Public
4	K	1	MD	F	Suburban	Public
5	2nd	2	MD	F	Suburban	Public
6	5th	2	MD	F	Suburban	Public
7	K	2	NY	F	Urban	Charter
8	1st	1	MD	F	Suburban	Public
9	2nd	1	MD	F	Suburban	Public
10	5th	1	OH	F	Urban	Private
11	K	2	GA	F	Suburban	Public
12	3rd	2	MD	F	Suburban	Public

Data Collection

For the collection of data in this study, I conducted one semistructured interview with each of the 12 participants. I held the interviews between May and July of 2020. Because of the international health crisis, it was not possible to conduct the semistructured interviews face-to-face, so I used the approved alternate plan of conducting the interviews via Skype. Interviews were scheduled at a mutually convenient time that allowed the participants to interact with me via Skype. The interviews took place in a non-distracting environment, as recommended by Burkholder et al. (2016). Each interview lasted between 50 minutes and 70 minutes. Before the interview, an interview intake form helped me establish participant criteria and collect demographic

information (see Appendix B). I used the same form to facilitate different points of contact with participants, such as the date of initial contact, the date of the interview, the date of a follow-up e-mail, and the date I sent a thank you note. The interview intake form helped the data collection process to proceed smoothly and accurately.

Procedures during the interview were conducted without variation from the plan in Chapter 3. During the interview, I used the interview protocol to guide the interview, making notes on the guide to help with follow-up questions. As the interview proceeded, I returned to the notes as appropriate to ask the participant to elaborate when needed to create the in-depth accounts of participants' experiences and perceptions that characterize qualitative research (Percy et al., 2015; Ravitch & Carl, 2016). I recorded the interviews in video and audio formats through Skype as well as the Rev audio recording app on a smartphone. This duplication allowed for backup recording should one of the recording devices fail. I sent audio recordings electronically to the Rev transcription service immediately following the interview, which were returned within 24 hours. I reviewed them for accuracy within 24 hours of their return. This timely review is especially important when the researcher relies on a transcription service; a researcher's review of the transcript for accuracy is more effective soon after the interview is concluded (Rubin & Rubin, 2012). Reviewing the transcripts as they were generated also allowed for the beginning of the analysis process and identification of similarities and differences between participant responses (McGrath et al., 2019). With careful attention to plan, the data were collected as anticipated.

Following the review of each transcript, I completed two steps to begin to engage deeply with the data and develop an understanding of participants' perceptions about and application of DI. First, I completed a contact summary form to clarify and connect the ideas shared in the interview data. The contact summary form for this study was designed based on the sample contact summary form provided by Miles and Huberman (1994, p. 53) and can be found in Appendix C. Next, I completed entries in a researcher journal to document my thoughts about participant responses throughout the interviews. As recommended by Ravitch and Carl (2016), I used the journal as a place to narrate my thoughts and observations, allowing me to make connections between the data, the conceptual framework, and the research questions. These steps helped me develop and clarify themes as they evolved, allowing me to begin to address each research question.

Data Analysis

The data analysis plan developed in Chapter 3 guided the analysis process. Before data collection, I created the interview protocol to address the research questions through the lens of the conceptual framework. Analysis continued recursively through the process of conducting interviews, coding data, and developing emergent themes and findings. See Figure 1 for a representation of the relationships between codes and categories.

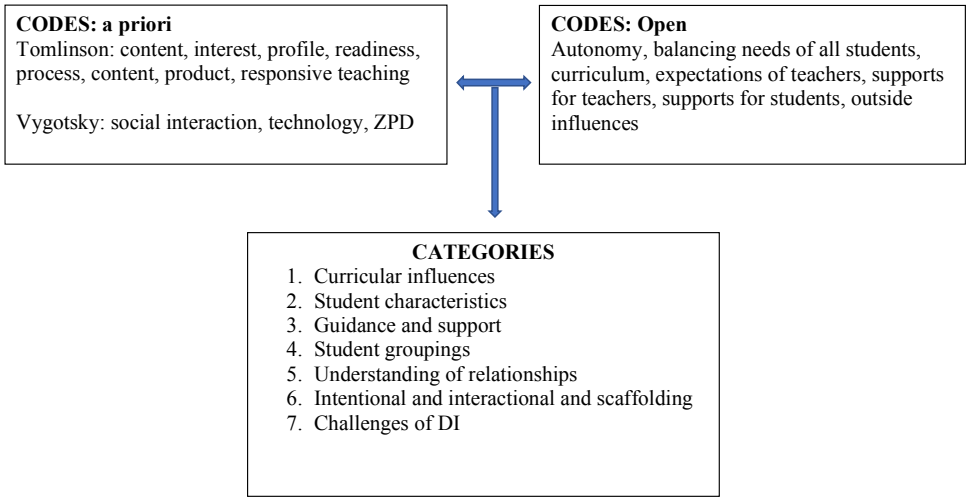

Figure 1. Data analysis flowchart: Progression from codes to categories.

Codes

To begin data analysis, I developed an initial list of a priori codes that were deductively aligned with the study's conceptual framework (Burkholder et al., 2016; Percy et al., 2015). For Vygotsky's (1978) theory, I designated these a priori codes as social interaction, technology, and ZPD. The codes connected to Tomlinson's (2014) model of DI were content, process, product, interest, readiness, learner profile, and responsive teaching. As I coded data from the 12 interviews, I reduced some of the a priori codes into subcodes to provide clarification. Sub-coding is a secondary coding process to identify nuances in the initial codes (Saldana, 2016). For example, the code "social interaction" was broken into the subcodes "student-to-student interaction," "instructional teacher-to-student interaction," and "student/teacher relationship building." These codes and subcodes provided an initial structure for identifying data that could help answer the research questions in alignment with the conceptual framework.

I also developed additional open codes inductively. Through repeated reviews of the transcripts, I noted that participants shared relevant information related to autonomy, balancing student needs, curriculum, expectations placed on teachers, supports for students, supports for teachers, and outside influences that influenced DI. I coded the transcripts for these codes as well. These inductive codes contributed insights about teacher experiences beyond the initial a priori codes.

Categories

The next step in the analysis utilized axial coding. During this second-stage coding process (Saldana, 2016) I reevaluated the a priori codes and open codes and organized them into relevant categories. I used this process to reorganize the data to best represent the concepts of novice teachers' perceptions and application of DI, as referenced in the conceptual framework and the research questions. As a part of this analysis process, I looked for commonalities, differences, and patterns to synthesize the data into relevant categories (Merriam & Tisdell, 2016; Saldana, 2016). I recoded initial codes into these categories: curricular influences, student characteristics, guidance and support, understanding of relationships, intentional and interactional scaffolding, and challenges of DI.

Themes

Through thematic analysis, the categories were sorted and linked together to generate broader themes (Saldana, 2016) and summarize key ideas from the data set (Nowell, Norris, White, & Moules, 2017). Five themes related to novice teachers' perceptions and applications of DI became evident during coding, categorizing, and

analysis. For Research Question 1, the first theme that emerged was that novice teachers perceived DI as a narrow instructional practice. Within this theme, subthemes emerged, including the way teachers referred to DI as a noun and as an independent activity. The second theme that emerged addressing Research Question 1 was that novice teachers perceived several external factors as influences on their use of DI. Two subthemes became apparent here, including the influences of prescribed curriculum and classroom support personnel. The final theme for Research Question 1 was that novice teachers perceived multiple factors as contributors to the challenges of DI. Several subthemes became apparent, including student academic and behavioral needs, limited flexibility provided to teachers, and the pressure on teachers to meet multiple needs simultaneously.

Two themes emerged related to Research Question 2. First, novice teachers used affective strategies to facilitate DI, with subthemes of establishing relationships and generating student engagement. Second, novice teachers successfully demonstrated the application of some components of DI as described in the conceptual framework. In this theme, subthemes emerged related to the understanding of student characteristics, instructional decision-making, and responsive teaching. These five themes together supported the findings for each research question; I describe the themes and findings in detail in the following section.

Results

A study's results are synthesized from the themes that emerged in the data analysis process (Merriam & Tisdell, 2016). In this study, several themes and findings contributed to the results and offered answers to the research questions. The results

suggested that although novice teachers demonstrated an understanding of DI's overarching concepts, their perceptions and applications of DI were limited when viewed through the conceptual framework provided by the research of Tomlinson (2014) and Vygotsky (1978). The themes and findings are described in detail in the following sections, organized by each research question.

Research Question 1

Research Question 1 was "What are novice teachers' perceptions about DI in their kindergarten through fifth-grade heterogeneous classrooms?" During interviews, I asked novice teachers how they perceived they could best meet the needs of students in their diverse classrooms. Three themes emerged. First, novice teachers perceived DI as a narrow instructional practice as compared to the conceptual framework. General findings suggested that novice teachers perceived DI as comprised of discrete instructional strategies and materials, rather than a comprehensive approach to educating students, as Tomlinson (2014) described. Second, novice teachers perceived that external factors influenced their use of DI. They attributed their level of implementation of DI to multiple factors outside of the sphere of their control, such as a prescribed curriculum and the availability of support personnel to provide instructional intervention for students. Finally, novice teachers perceived multiple factors as contributors to the challenges of DI. Novice teachers consistently described their perception of DI as overwhelming and frustrating to apply effectively.

Theme 1: Novice teachers perceived differentiated instruction as a narrow instructional practice. During the interviews, novice teachers described their perception

of meeting students' needs through DI in narrow terms. They consistently expressed that meeting students' needs could be accomplished simply through discrete instructional strategies and differentiated materials or through interactions with intervention support teachers in and out of the classroom. These two subthemes that emerged related to the practice of DI, providing further depth into this theme.

Differentiated instruction was referred to as a noun, not an instructional process. Although Tomlinson (2016) described a holistic, interrelated process of DI, novice teachers frequently described DI as a noun rather than an instructional approach or process. Consistently through the interviews, participants referred to DI as a worksheet or a specific interaction designed to support students' academic achievement as a supplement to traditional instruction. They referred to the term DI when describing the separate curricular materials or instructional steps teachers could use to support those students not well-served by the general curriculum. They also described DI as the interactions during small, ability-group instruction.

This perception was evident in the statements of several participants. Participant 9, a second-grade teacher, described DI as "task cards" posted around the room. On the cards were pre-determined tasks for students, each card associated with a worksheet for students to complete. Participant 9 would adjust the task cards for different academic skill levels by, for example, "making a word problem wordier." Participant 4, a kindergarten public-school teacher, discussed a textbook teacher's manual that provided scripted whole group lessons but also noted worksheets as specific tools that could be used to provide DI as "light, moderate, or high support" for individual students, as needed.

Participant 10, a fifth-grade private-school teacher in an urban area, described a similar resource from a teacher's manual:

> I also had a whole packet of it; it was called differentiated instruction, which I would give to the accelerating kids if they finish super-fast…They'd be like, "I'm done. What do I do now?" I would give them that page.

All participants described the scaffolded materials used in guided reading ability groups as the primary component of differentiation. The perception of DI as a discrete activity rather than a process was evident across grade levels and in both public and private school settings. This discrete definition of DI expressed by teachers was inconsistent with Tomlinson's (2014) definition of DI as a holistic approach.

Differentiated instruction often was described as an independent activity. Also inconsistent with Tomlinson's (2014)model was teachers' descriptions of DI as an activity that students frequently completed on their own. Although independent differentiated work might serve as one strategy in Tomlinson's model, novice teachers did not describe using the strategy as a part of an intentional, varied approach. In addition to the worksheets, novice teachers provided time for students to use computer programs individually to play games or read materials appropriate for their academic level. These programs often used adaptive technology to provide scaffolded support appropriate to support academic growth within a student's ZPD. For these novice teachers, the use of the technology was an instructional practice separate from other curriculum components, inconsistent with the model of DI.

As an example, Participant 1, a first-grade teacher in an urban public school, described how, after using an online formative assessment for math, students would complete the games prescribed by the program based on assessment results. “It’s independent quiet time, headphones on, no talking.” Participant 8, a first-grade teacher in a suburban public school, and Participant 10, a fifth-grade teacher in an urban private school, regularly assigned differentiated books and math problems from educational websites for individual students and attached quizzes at the end of each assignment to check for understanding. When asked about supporting the needs of one student capable of math objectives 2 years higher than his current second-grade class placement, Participant 9 expressed that she was able to differentiate for the student mostly by using technology for independent work. Similarly, Participants 7 and 11, both kindergarten teachers, one in an urban school and one in a suburban school, explained that to meet the needs of students working above grade level, they assigned a computer program to provide individualized instruction. These independent activities were often only peripherally related to classroom instruction. Again, the perception of DI as an independent activity spanned grade levels and was described in both public and private school settings.

Theme 2: Novice teachers perceived several external factors that influenced their use of differentiated instruction. Novice teachers noted that the resources available to them influenced their perceptions about and applications of DI. Novice teachers perceived the curriculum provided to them as a strong influence, both positive and negative, on the ways they could meet students’ needs. The availability of additional

adults, both in and out of the classroom, to support students also affected novice teachers' perceptions about DI.

Prescribed curriculum. Tomlinson (2014) asserted that one principle of DI was building instruction on a foundation of quality curriculum. The novice teachers in this study described a wide range of curricular materials used to support student learning in the classroom, including materials prescribed by their schools or districts and materials they designed themselves. Teachers sometimes sought out additional materials or created materials that they felt best addressed their student needs.

Novice teachers expressed mixed feelings about prescribed curriculum. Those who were prescribed curricular materials by their school or district often described limitations in the way student characteristics were represented in the materials or the fact that whole group lessons used materials that were not appropriate to meet some students' academic needs. Yet many described their appreciation of how the prescribed curriculum also provided them with discrete DI activities designed to support students performing at higher and lower levels and ELLs. Still, most novice teachers described their prescribed curricula as inflexible and impractical for providing DI. In almost all cases, text materials were limited to what was provided in commercial programs or on approved designated district lists. Many teachers expressed dissatisfaction with the relevance, interest, ability levels, and cultural representations in the texts, all factors that contribute to engagement. For example, Participant 4, a public-school teacher, said, regarding the provided lessons and the texts:

> It's not relatable. It doesn't make any connections to their own lives. Sometimes you find this great book that might go with what the story is teaching or something more, but [we] have to stay with what the program has provided.

Participant 1, a private school teacher, expressed that the provided curriculum was too complex for most of her students. Regarding flexibility, Participant 7, a charter-school teacher, reported that, "at my school, it is so structured, and you do this for this much time and that for that much and everything is guided." Many teachers expressed a desire to use project-based learning and hands-on learning opportunities to provide different modes of instruction. However, they were unable to do so either because they didn't know how, they didn't have time, or they were restricted from doing so by their district requirements. Participants from public, private, and charter schools all perceived curriculum as a limitation to effective instruction.

On the other hand, at the same time, many teachers were glad that the prescribed curriculum gave them a starting point to apply DI. Participant 4, a kindergarten teacher, described her appreciation of teacher manuals that provided academic supports and supports for ELLs: "it'll have side notes of things we can do to enrich and things that we can do to support…so it gives us that information." She continued, "All the books are provided, all the lessons are scripted. And the books that we're supposed to read are all provided, but you're expected to stick to that only." Participant 3, a third-grade teacher and the only male participant, expressed this dichotomy: "I think having a basis to go from, a curriculum to draw from is very beneficial. You've got to trust that experts have put that curriculum together and understand what is needed for students." Though

Participant 7, also a kindergarten teacher, described what she felt were overly prescriptive classroom procedures: “your opening should be this long, and you should have this many turn-and-talks and this many call-and-responses or checks for understanding, things like that,” she followed up with this: “But it can be overwhelming to create my own lessons.” The participants who taught in kindergarten and first grade reflected this appreciation of a prescribed curriculum more frequently than those who taught in higher grades. However, regardless of grade level or type of school, the influence of prescribed curriculum was a common concern shared by participants.

Support personnel. Tomlinson (2014) provided extensive examples of effective instruction designed to meet students’ different needs; however, these examples did not mention the utilization of additional adults to support DI. Novice teachers expressed that the individuals who came into the classroom or pulled students out of the classroom for instructional support were critical to meeting their students’ diverse language, academic, and behavioral needs. Many described their dependence on individuals providing DI directly to students within and without the classroom, such as paraeducators, interventionists, ELL teachers, and special educators. Most teachers described multiple ways that individuals came into the classroom or pulled students out of the classroom to address academic needs. Those teachers who did not have this resource expressed the need for such to support them in DI. Without these supports, many novice teachers questioned their ability to meet the range of needs of their students.

Often, it was the support personnel who applied DI for students with varying language or academic profiles, while the classroom teacher met the needs of the rest of

the students. Participants described this perception repeatedly in interviews. Participant 1, a first-grade teacher in an urban school, discussed an ELL student who only spoke Spanish and shared, “I expressed this to my principal; I can’t be teaching him this lesson in Spanish. It doesn’t really work. That’s why the ELL teacher’s in the room to help, too. It’s really hard to do it [without the ELL teacher].” Participant 7, a kindergarten teacher in an urban setting, taught in a co-taught inclusive classroom with another full-time teacher and a math specialist during math instruction. The math specialist pulled small groups for targeted support intervention. Participant 2, also a kindergarten teacher but in a suburban setting, relied on teaching assistants to lead guided reading groups and strategy groups and pull students individually to complete formative evaluations. Participant 10, a fifth-grade teacher, relied on an intervention specialist to provide homework at an appropriate level for students when the assignments provided to the rest of the class were not suitable, and there was no time for her to make modifications herself. Participant 4, a kindergarten teacher, shared that she did not have support personnel except for short periods. She could not meet with small groups for DI except in the few opportunities when paraeducators pulled students for special education services. The lack of opportunity to meet with small groups interfered with her ability to meet student needs. Several teachers also described the need for support personnel to assist with behavioral concerns. Both Participant 6, teaching in fifth grade, and Participant 7, teaching in kindergarten, described students who had paraeducators traveling with them during the school day to intervene when there were inappropriate behaviors so that teachers’ instruction could proceed with as little disruption as possible.

Both teachers who had support from additional adult professionals and those who did not deemed their presence to be essential. Teachers who reported having substantial support for students in and out of the classroom, including Participants 1, 5, 7, 11, and 12, said the support was essential. When asked about having both a regularly scheduled interventionist and a full-time paraeducator, Participant 11 said this:

> I don't know what I would do without my full-time para in the room every day. I think everyone should have one because it's fantastic, and the kids get to be with another teacher to work on skills. So, I think that's awesome. And then when they're pulled, it's more one-on-one, and she's focused just on what they need help with.

Participant 5 reported similarly:

> I had great supports in my school from even my assistant principal and my principal helping me, our reading resource teachers, and our Title I resources helping. And I found that it was a lot easier to do when we were able to group the kids more closely together [based on academic needs].

Those who did not have much support, such as Participants 4, 6, and 9, all public-school teachers, wished they did. Participant 10, the only private school teacher interviewed, also wished for more support. She reflected that in her small school, there was only one interventionist working with students with IEPs from Kindergarten through grade 8: "She doesn't get to work with some of the kids as much as I feel they should. It's because she has a heavy workload with all of those kids." In Participant 10's ideal fifth-grade classroom, she would provide special education students more time pulled out of

the classroom for support to "focus on what they needed to focus on." Even those with resources felt the need for more. Describing an ideal classroom for meeting students' needs, Participant 1 included a special educator and an English language teacher in her first-grade classroom full-time, teaching the same subjects for the special education and ELL students while she worked with the general education students.

There seemed to be an even distribution between public-school teachers who had regular support in the classroom and those who did not. Participant 10, the only private school teacher in the study, though, did not have what she thought was sufficient support. Participant 1 summed up the thoughts of most participants: "We need more support, of course. Everyone does." Teacher participants across grade levels and settings felt that only when support personnel were involved were students' language, academic, and behavioral needs met. All participants acknowledged the influential role support personnel played in DI.

Theme 3: Novice teachers perceived multiple factors as contributors to the challenges of differentiated instruction. These perceptions included a range of factors, including meeting students' academic and behavioral needs, a lack of flexibility allowed in teaching, and pressures placed on teachers to differentiate instruction to meet students' multiple needs simultaneously.

Academic needs. Because grade-level classroom placements are often based solely on the criteria of student age (Knutsen & Svendsen, 2019), and because children do not develop cognitively at the same pace (Vygotsky, 1935), inclusive classrooms often consist of students with academic abilities spanning multiple grade levels. Novice

teachers in this study expressed frustration because they believed the academic needs of students in their classrooms were too great.

Participant 5, a second-grade teacher in public school, described the range of ability present in her classroom like this:

> I had students who had never read in English before, so we were starting that reading development from the ground up. And I had students that were reading well above grade-level, within a fourth-grade, even a fifth-grade reading level.

When I asked how she managed a classroom with such varied needs, she said, "I'm not going to lie; it is very, very hard." Participant 11, a kindergarten teacher, summed up the perception of many of the participants:

> If you were to look at every single kid, there's something that you could always pull them for to work one-on-one with...but it's kind of like you have to pick the students that are really struggling to help bring them up to the level or the kids who are super high to keep them going. And I think that's the hard part of balancing all of that while you still want to work on the kids who are on grade level to keep them moving forward. So, in an ideal world, you could meet with everybody. But in the realistic world, that doesn't happen.

This perception was widespread among study participants.

Behavioral needs. Notably, when asked about meeting student needs, almost all participants mentioned the first area of concern was behavior management. This was true, except for two teachers, Participant 5 (a second-grade teacher in a suburban public

school) and Participant 11 (a kindergarten teacher in a suburban public school). These two cases are discussed in the Results section.

Tomlinson (2014) asserted that in classrooms with DI practices, those practices increased motivation and engagement and reduced inappropriate behaviors and their disruption in the classroom. However, rather than addressing behavior through the components of DI, participants viewed it as a separate issue. When discussing the problems they encountered with applying DI in the classroom, novice teachers described how student behaviors led them to make decisions that inhibited DI. Student behaviors often interfered with effective student groupings, requiring teachers to do independent activities or pair activities when group activities might be more appropriate. Student behaviors interfered with collaborative student work or prevented flexible groupings because of the negative impact on student learning. Allowing students to work on self-paced activities sometimes resulted in off-task behavior. In some cases, student behaviors demanded substantial teacher attention, interfering with the teacher's ability to work with other students effectively. These problems occurred even though novice teachers worked proactively to establish classroom routines and expectations to manage classroom behavior. Novice teachers consistently viewed behavior as the defining characteristic of students and the first area they must address before they could effectively differentiate instruction. Yet, participants described addressing student behavior concerns outside of instructional practices, contrary to Tomlinson's assertion.

Participants described two approaches to behavior management. First, most participants established classroom routines and procedures associated with increased

student engagement, such as greeting students at the classroom door with positive comments and holding classroom community circles (Tomlinson, 2014). They also described behavior contracts and schoolwide classroom management programs, such as Positive Behavioral Interventions and Supports, based on extrinsic motivation, that inconsistently had a positive influence on student behavior. Even with the use of both approaches, novice teachers were frustrated with the way student behaviors impacted learning.

According to participants across grade levels and settings, behavior concerns frequently interfered with instruction. Participant 7, a kindergarten charter-school teacher reflected: "At one point, I think we had 15 of our 32 students who we were trying to make individualized behavior plans for. Then it was like, 'How is this possible? How are we going to be consistent with this?'" Participant 7 described the way behavior influenced teaching practices with her co-teacher in her urban, kindergarten classroom:

> At the very beginning of the year, because of all the behavior issues, it actually was too overwhelming for either one of us to just teach whole group. So we did parallel teaching where she would teach the exact same lesson to half the class, and I would teach half the class. It doesn't work. So, we ended up just going back to whole group.

Except for the two discrepant cases, participants at all grade levels and school types expressed frustration that behavior management techniques were not working. It seemed important to them to address the behavior before applying differentiated approaches. This

perception minimized the potential for DI to influence student behavior positively, as suggested by Tomlinson (2014).

Limited flexibility allowed in teaching. The DI model of instruction involves much flexibility and responsive teaching, which require shifts and changes in instruction based on students' characteristics and needs (Tomlinson, 2003, 2014). Participants felt frustrated that they were allowed only limited flexibility in their teaching, inhibiting their use of DI. Though many teachers wanted to cater their teaching practices to their students' interests and needs, they were discouraged from straying from school and district guidelines.

Two common frustrations shared by participants were the lack of ability to adjust teaching timelines in the interest of their students and pressure to stay with scripted procedures. Participant 3, a third-grade public-school teacher, expressed a desire to control the amount of time spent on concepts and topics, based on what students were interested in or with which they were struggling. Instead, he said they often had to move on because of the required schedule. Participant 8, a first-grade public-school teacher, said:

> some of the things that you want to do are a little bit more in-depth…to kind of get a little bit more hands-on, a little bit more interesting. But when you only have a certain timeframe that you're supposed to get everything done, it's hard.…I think that's a big issue with trying to, I guess, incorporate extra things or more interactive things.

Participant 4, a kindergarten teacher, shared that she felt pressure to run the classroom as scripted, or she would get in trouble. Participant 7, also a kindergarten teacher, expressed that her urban charter school required specific procedures and restricted her actions to the point that she did not feel comfortable. She said, "So, when I first started at this school, immediately it was like, 'I think I made a big mistake by coming here. It's not my teaching style.'" Participants reported frustration at these restrictions on teacher autonomy across grade levels and settings.

Pressure to meet multiple needs simultaneously. Novice teachers reported feeling overwhelmed by the expectations to meet the full range of students' needs in their classrooms. Most participants described great frustration with the expectation to meet not just academic and behavioral needs but also the socioemotional needs of students. This frustration spanned grade levels in public and private schools.

Participants shared their frustration with the expectations placed upon them. Participant 12, a third-grade teacher, talked about the changed role of teachers over time:

> It used to be that teachers could ask of students, "Do you know your ABCs?" [If yes,] great, you did your job. Now it's like, "Okay, can you make friends? Can you follow directions? Can you interact with your peers? Can you interact with your teacher? Is your home life okay? If not, what can we do to help?" I think my role as an educator is nothing. I never expected it to be what it is."

In Participant 9's second-grade suburban public-school classroom, an all-school behavior initiative required teachers "to come up with [a reward] that's so fun that they're going to want to work towards this, even the students that aren't motivated to do anything. You

have to come up with that. And so, it's a lot." Participant 2, also a kindergarten teacher, said:

> My school is very into meeting the needs, every single point of every single child, and it's exhausting. I need to help every single child, make sure that they are feeling the right way all the time. And I spend a lot of my energy making sure that every child has what they need…and I think the academics are important, but at this age, that behavior side and that emotional side and that social side are just so important because you want to build that strong foundation…. I have been super overwhelmed by that.

Participants consistently described feeling overwhelmed by students' needs as they attempted to support students with multiple needs outside of academics.

Finding 3 reflects participants' perceptions of DI as overwhelming and frustrating. This perception was due largely to the expectations placed on them to meet a range of needs from academic to behavioral to socioemotional. Meeting these needs simultaneously under conditions that limited their flexibility led participants to express frustration in their ability to meet students' varied needs.

Conclusion. The first research question focused on novice teachers' perceptions about DI to meet students' needs. Overall, participants described their understanding and perceptions about DI in a much narrower way than that of the model of DI presented in the conceptual framework, describing DI as something students could do rather than an approach to teaching. They perceived factors outside of their influence, such as prescribed curriculum and access to personnel to provide support for students, as crucial

to differentiate and meet students' needs. They also indicated that the expectation of meeting students' multiple needs through DI was frustrating and overwhelming. Understandably, these novice teachers' perceptions about DI influenced their applications of DI, which was the focus of Research Question 2, described in the next section.

Research Question 2

Research Question 2 asked the following: What instructional practices do novice teachers describe using to promote the success of their students in kindergarten through fifth-grade heterogeneous classrooms? During the interview, I asked participants to share how they supported student learning through interaction, assessment, responsive teaching, and the consideration of various student characteristics. I identified two themes related to the instructional practices of novice teachers. First, novice teachers used affective strategies to facilitate DI. Second, novice teachers successfully demonstrated the application of some components of DI as described in the conceptual framework. Specifically, novice teachers addressed the components of student characteristics, instructional decision-making, and responsive teaching. General findings suggested that novice teachers successfully fostered prerequisite conditions that facilitated the potential for the use of DI in the classroom. Additionally, novice teachers used multiple research-based strategies to differentiate instruction in the classroom but were not yet proficient in the complex process of DI, as described by Tomlinson (2014) and Vygotsky (1978).

Theme 4: Novice teachers used affective strategies to facilitate differentiated instruction. Although Tomlinson's (2014) model of DI focused on supporting learning through curriculum and instruction (the content, process, and product in the model),

Tomlinson also discussed prerequisites to DI that facilitated the approach in the classroom. These prerequisites focused on meeting the affective needs of students and establishing a positive learning environment. Novice teachers described their efforts to meet students' affective and emotional needs and their belief that those needs superseded academic needs. Participants supported socioemotional skills through social interaction, thereby developing motivation, self-confidence, and low anxiety. Many of the practices that novice teachers described using to meet their students' needs were not DI, but rather strategies to meet the prerequisite conditions of DI, including relationship building and facilitating student engagement.

To facilitate DI, all the teachers in this study shared strategies they used to create positive classroom environments, an important condition of DI described by Tomlinson (2014). The most prominent strategies they described involved the development of relationships with students. They did this with positive greetings to students as they entered the classroom and respectful interactions throughout the school day to establish trust and let students know that teachers care about them. Novice teachers also described ways they made the classroom fun and joyful for students to engage them in learning activities. These included singing and dancing, games, hands-on projects, and active problem solving. Teachers established a positive classroom environment essential for DI to occur. These opportunities were provided to students by all participants, regardless of grade, geographic location, or type of school.

Caring relationships. Participants deemed forming relationships to be of the utmost importance in facilitating student success. Novice teachers consistently developed

relationships with students and parents to facilitate meeting students' needs in the classroom. They created opportunities for care, attention, and respectful interactions with students during teaching and learning opportunities.

All participants reflected their understanding of the concept in their discussions about student-teacher relationships. Participant 1, a first-grade teacher, and Participant 11, a kindergarten teacher, both described relationship building by greeting students at the classroom door each morning. Participant 1 said, "…they know that their day has started by me being happy that they're there." Participant 2, a kindergarten teacher, described morning meetings during which she interacted with students and students interacted with each other to start the day on a positive note. Participant 4, another kindergarten teacher, reflected on her understanding of these relationships:

> I think that's the most important I've learned is you can't just rush into teaching a kid without getting to know them…you could tell that they were more willing to do the work, or at least try, by having that relationship.

Participant 8, a first-grade teacher, expressed why building relationships was so meaningful:

> you're not going to listen to somebody if you don't care about them, and you know they don't care about you. So, kind of making sure that we have that safe environment and that caring environment definitely helps to make sure that they are going to learn from me.

These kindergarten and first-grade teachers emphasized relationship building in the examples, but the relationship development was widespread among teachers and grade

levels. Through caring relationships, all participants paved the way for effective DI and increased student learning.

Student engagement. Similar to the way student-teacher relationships create opportunities for DI to be successful, student engagement is a factor that facilitates learning (Tomlinson, 2014). Most participants put strategies in place to make the learning environment engaging and fun, and some described the methods they would like to use, given the opportunity. Many of the strategies described were student-centered and constructivist, involving students in the learning process. Although student-centered approaches do not always constitute DI, they are useful tools for creating the prerequisite environment in which DI may succeed (Tomlinson, 2014). Novice teachers demonstrated an understanding that students learn best when engaged.

Participant 3, a third-grade public-school teacher, reinforced the importance of engagement by sharing his goal with students: "I want to accomplish two things today. I want us to learn a little something, and I want us to have fun doing it." Participant 5, a second-grade public-school teacher, described providing shaving cream, play-doh, and magnetic letters for students to practice writing sight words. She said, "I could just give [students] a list of problems. Here's ten problems, sit at your desk, do them. But no, let's make a game out of it. I think school should be fun…[students] should enjoy coming to school." When asked what she would change about her current curriculum, Participant 7, a kindergarten charter-school teacher, like several other participants, described project-based units, hands-on activities, and materials with which students could be more engaged. She said: "I know in some of the stories we read, even I'm sitting there reading

the interactive read-aloud like 'I don't want to read this anymore. This is boring.'" Novice teachers utilized and described strategies that increase engagement to support the possibility of DI across grade levels and school settings.

Theme 5: Novice teachers successfully demonstrated the application of some components of differentiated instruction as described in the conceptual framework. The use of DI by participants included the consideration of several aspects of effective instruction, as discussed in the conceptual framework: an understanding of student characteristics, instructional decision-making, and responsive teaching. In each of these aspects, participants demonstrated both effective use of strategies for DI and a need for greater proficiency in DI.

Student characteristics. Participants considered some aspects of student profiles to design instruction to meet their needs, most notably, academic characteristics. In fact, the most common student characteristic used in the application of DI was academic ability. The teachers consistently identified and addressed, through effective DI, the academic characteristics of a student's learning profile. Most teachers evaluated academic skills and designed instruction based on the evaluation data. This process most often involved using formative assessment, a strategy recommended for DI by Tomlinson (2014). Participant 11, a kindergarten teacher, explained:

> We do this overall pre-assessment at the beginning of the year, and then based off of that, I think a lot of things just build on top of it. So, with math, we could be working on numbers 0-5 for 1 week, and the next week it'll be 5-10, but if I see

> that the kids are struggling, then I'm not going to move them up. I'm still going to work with the lower numbers with them.

Participant 5, a second-grade teacher, described a similar process of "being able to take the data from those formative assessments on day one and forming my groups based on that formative assessment data. And really allowing those groups to be flexible." Many participants effectively used adaptive computer games for both reading and math skills; the games' adaptive nature allowed each student to work on those skills most appropriate for their ZPD.

Participants also used some strategies specifically to meet the needs of more advanced students. Often, they accomplished this by addressing the advanced skills identified during formative assessment in a small group setting or through adaptive technology. One teacher described meeting advanced students' need to work within their ZPD by sending them to interact with students and teachers in a higher grade-level classroom for some portions of instruction. However, many participants described times when opportunities for advanced students to move forward academically were lost. Participant 2, a kindergarten teacher, tried to keep advanced learners engaged by giving those students:

> a chance to share with their classmates what they know, maybe help out, volunteer, raise their hand a lot. I'll make sure that I call on them and really make them feel good about the knowledge that they do know.

Although she likely maintained these students' attention, she did not advance their academic skills in this situation. Participant 7, also a kindergarten teacher, explained that

when a higher-level learner would finish work early, "that would be a good time for him to go on a break and just relax. Actually, a lot of the higher students, that was a good time for them to just take a second and use the bathroom…or get a drink of water." The discrepancy in meeting the needs of advanced learners may have resulted because participants expressed that expectations were placed on them to focus on meeting the academic needs of less-skilled students. Participant 2 expressed the sentiments of many participants:

> I think that's something that goes without even having to be said for new teachers and for teachers in general...it's definitely more encouraged to make sure that those kids that are standing out because they're lower are coming to the middle ground. And then those kids that are higher, [administration] is like, "Oh, whatever, they're fine."

Participants' descriptions of their applications of DI exhibited mixed levels of complexity required to support students' academic learning. Kindergarten through second-grade teachers most often expressed that they focused on meeting the needs of academically weaker students and did not pursue opportunities to advance stronger students.

Although participants utilized their understanding of student characteristics to meet the academic needs of students through DI in many ways, participants did not address with complexity the elements of race or culture. Participants seemed to consider race and culture as superficial characteristics, or ones that were not necessary or appropriate to address in the classroom. Despite their classrooms' racial and cultural diversity, most teachers indicated that these characteristics played very little role in

meeting their students' needs. Even with prompting during the interviews about how they addressed race and culture in classrooms, teachers said very little. Those participants who acknowledged the importance of race and culture addressed them at a surface level (Moule, 2012) by assuring text materials represented different ethnicities or that students learned about holidays from different cultures. This use of text materials was true of most of the suburban public-school teachers. The novice teachers discussed little knowledge or consideration of any other cultural learning factors.

Several teachers, from both urban and suburban public schools, reported directly that race and culture played no role in differentiating instruction. One of the participants from an urban school reflected, "What would that even look like?" Another kindergarten teacher from an urban school explained that she struggled to address culture and race because she was of a different race than most of her students. Although novice teachers described a need to provide multi-modal, multicultural learning experiences, it seemed to be from a very general perspective, rather than to address with complexity the learning profiles of specific students or groups of students. Participants, those from urban and suburban schools, described limited DI based on race or culture.

Instructional decision-making. Participants in this study demonstrated skill in DI through some of the instructional choices they made in the classroom. One widespread instructional choice made by participants was to use student groupings to address their students' academic diversity in reading and math. The teachers felt that one of the most effective ways to meet students' needs in reading and math was through the strategy of grouping by ability. Traditional ability grouping involves students of homogeneous

ability levels. However, students may also be grouped heterogeneously by ability to meet needs as well. Participants' groupings included pairs, collaborative small groups, and instructional groups meeting with a teacher. All participants utilized effective, flexible student groupings.

In homogeneous academic groups, novice teachers provided planned, scaffolded instruction to different ability groups separately, meeting the ZPD for students in each of the groups. For example, for reading instruction, almost all the novice teachers used a similar model, including limited whole-group instruction using a grade-level text, followed by small-group guided reading instruction using ability level books. Participant 4 described this approach:

> A whole group when we're on the carpet can be a little tricky because it's so hard to meet everyone's needs when they're all together. So, for reading, I try to just keep all my students who will need extra support together.

Participants frequently used a similar model in math. Participant 1 described how she organized students for small-group math instruction:

> So, if we're doing a unit on place value, we'll go into the i-Ready data and take a look at how they scored on place value and what concepts they're missing. Place them in a low group, another low group, a medium, or a high performing group based on where they fall and where we can support them.

When students were grouped based on their ZPD in reading and math in these scenarios, the teacher served as the "more capable other," as described by Danish et al. (2017, p. 6)

for effective instruction. The methods and materials planned for each ability group varied based on skill level and learning goals.

Novice teachers also used heterogeneous ability groups to support Vygotsky's (1978) concept of ZPD and social learning, although with less proficiency. Often, these groups consisted of pairs, with one higher achieving student and one lower achieving student. Sometimes the groups consisted of three or more students with varying ability levels. However, novice teachers most often used these groupings to address the academic needs of struggling students. Novice teachers consistently reported relying on an academically stronger student to serve as the "more capable other" for another student or students in a group. Participant 10, a fifth-grade teacher, reported, "I would have my kids who accelerated help the ones who were struggling." Participant 3, a third-grade teacher, shared that "there are times where I pick students who are a little above grade level with students who might need that peer support." Participant 5, a second-grade teacher, said that she chose to "pair up a high student with a low student...to put those students together so those students who might need that little extra support, the other students can model for them." Such heterogeneous groupings were more common with teachers of grades two through five than teachers of kindergarten or first grade.

Novice teachers acknowledged that students at higher ability levels needed challenges within their ZPD but did not consistently utilize DI grouping strategies effective at providing them. Instead, participants often addressed the academic needs of advanced students through technology. These students were assigned independent reading texts and math games within their ZPD on a computer.

Notably, although teachers used grouping strategies based on student ability in math and reading classes, they indicated that such groupings were not used in science and social studies classes. Instead, novice teachers discussed their use of whole group instruction along with the use of small groups formed based on compatible behaviors, self-selection, or random assignment. Participant 3 shared this: "we would break out into groups for different activities and projects, but as far as small group instruction...that didn't really happen in science." Instructional groupings in math and reading generally facilitated DI, whereas groupings in science in social studies were less purposeful for differentiating instruction.

Responsive teaching. Participants described many occasions when responsive teaching was necessary in their teaching practice. Although instructional decision-making often occurs in planning, teachers frequently need to make unanticipated adjustments during instruction. In this study, the use of responsive teaching was universal across participants. Participants were able to describe multiple occasions when they recognized student cues that indicated instruction needed to be adjusted. For example, Participant 3, a third-grade public-school teacher, discussing students on the autism spectrum, shared that "there's days where they want to be right there with you, and then there's days where they shut themselves off. So, you need to be in tune to that as far as changing up your approach and your teaching style." Participant 9, a second-grade public-school teacher, described a clear example of non-verbal student cues requiring a change in instruction: "you can only motivate students so much when the curriculum is so boring that they're

literally braiding each other's hair while you're reading this book." Participant 2, a kindergarten public-school teacher, reflected on learning to respond to student cues:

> I'm learning to be more aware of when it's time to just stop and try something new because it never ends well when you try and force it. Forcing 5-year and 6-year-olds into something that they're not ready for just never ends well.

All participants acknowledged the necessity of responsive teaching, although they exhibited the skill at different levels of complexity. In some cases, participants were able to adjust the instruction in the moment. Several participants explained that they would address needs for responsive teaching by either speaking with individual students as they were working, pulling an ad hoc small group, or returning whole group instruction to adjust instruction with the whole class, as needed. Participant 11, a kindergarten teacher, shared this experience with responsive teaching:

> I was like, "All right, we're going to stop. We're going to do something different." And I think what we did is that instead of just talking specifically about the quarter, I turned my room into a relay race, and so we pushed all the tables up, and I had the kids sort the coins. Honestly, I don't remember what I was trying to tie the quarters to. All I knew is that it wasn't working.

Participant 4, also a kindergarten teacher, shared a time when knowledge of a particular vocabulary word caused a disruption in learning and required a responsive change:

> I could tell the kids were just very confused about the story, what an 'event' is. It's just that word, event, was throwing them off, so then I just stopped the story,

> and we just talked about things that happened in our life or things that happened to us today, so that's an event.

Participant 1 described how she combined both intentional scaffolding and interactional scaffolding to teach in-the-moment. She planned a small-group reading lesson in advance but had supporting text nearby that she anticipated she might need. She reflected that it was something "that's done in the moment, but it is kind of planned ahead of time."

In other cases, participants needed more time to consider the adjustments that needed to be made. Rather than adjusting instruction in the moment, they came back the next day to address the lesson. Participant 3, a third-grade teacher, said:

> There's days where you just get that blank deer-in-the-headlights look like, "We got some questions, we're struggling," or I see on their exit ticket they all just didn't get it. Well, then, as a teacher, that next day, it's my responsibility to go back and reteach that because that's obviously something I didn't identify.

Upon teaching a lesson that did not go as anticipated, Participant 1 said that she would take time to reflect, "That afternoon, I'll sit and think, 'What did I do that wasn't supporting them enough?'" A strength for participants in the application of DI, regardless of grade level, was their use of responsive teaching.

Conclusion. The second research question addressed the application of DI by novice teachers in elementary classrooms. Novice teacher participants in this study described using multiple strategies to promote the success of their students through DI. First, they created conditions that facilitated DI by building relationships and establishing student engagement. They addressed the academic ability of students through formative

assessment, varied student groupings, and adaptive technology. They provided both intentional and interactional scaffolding to meet students' academic needs.

However, though all participants exhibited an understanding of the importance of meeting students' needs through DI, and expressed a desire to do so, some DI strategies were applied with more efficacy and complexity than others. The racial and cultural components of student profiles were rarely considered, and the needs of advanced students were less likely to be addressed than those of struggling students. Study participants demonstrated variable application of effective DI.

Discrepant Cases

Discrepant data, those which do not fit within the emerging patterns, are not uncommon in qualitative research (Ravitch & Carl, 2016). Despite commonalities among the participants' descriptions of their perceptions and applications of DI, I identified some notable discrepancies. These discrepancies related to student behavior as a factor in DI, the use of academic ability as the primary student characteristic for DI, and limitations to provided curriculum materials.

First, Participant 5, a second-grade public-school teacher, and Participant 11, a kindergarten public-school teacher, reported that student behavior was only a minor factor considered when meeting student needs, contrary to other participants. Each had a behavior management program in place that was effective, and neither considered behavior as a concern or challenge in meeting students' needs. Participant 11 said, "Everyone just got along together, we had great discussions and just being able to work together, I think, was a great part of my class." This sentiment was uncommon among

participants. Though these teachers may have had students who were already well-behaved and able to work together effectively at the beginning of their time together, it is also possible that the teachers' subtle use of DI helped establish and support those positive behaviors in the classroom (Tomlinson, 2014). Although both taught in suburban public schools, it is unclear if those commonalities were related to their experiences with classroom behavior that differed from other participants.

Further, some participants considered characteristics other than academic ability to guide DI. Both Participants 3, a third-grade teacher, and 4, a kindergarten teacher, presented discrepant data related to academic ability as the primary student characteristic considered in the application of DI. Unlike other participants who discussed academic ability first and almost exclusively, both Participant 3 and Participant 4 first discussed student learning styles, flexible groupings based on interests, and random groupings to allow students to work with others who might be different from themselves in ways other than academic ability. They then went on the describe groupings of students of similar ability and mixed ability, secondarily. The use of multiple student characteristics to inform instruction is in line with research-based models of DI (Tomlinson, 2014) and may suggest that these teachers had stronger skills in this area of DI than other participants.

Finally, not all participants were bound to the provided curriculum. Some were empowered to make changes as they saw fit. Participant 10, a fifth-grade teacher in an urban school, said, "I feel I have, as long as I'm following…the standards that the

[district] is giving us, I have pretty much free rein on what to teach." Similarly, Participant 1, a first-grade teacher in an urban school, said:

> If we look at this book, and we're like, "Nope, it's not developmentally appropriate. They're not going to get it. Nope." Our reading coach says, "Fine. Get it out there." In math, we've had to make the decision to combine lessons because there's way too many lessons in [the curriculum] for how long the year is. We just go, "Oh, can we combine the lessons?" "Sure." We are usually allowed to change anything that we need to.

These participants were able to adjust to meet the needs of their students. Though these actions demonstrated the capabilities to adjust and adapt instruction to accomplish DI, the discrepancies are possibly the result of allowances provided to the teachers by supervisors with compatible views about DI. Other participants may have adapted and adjusted instruction to accomplish DI had they been empowered to do so. The variation in grade level suggests that grade level was not a factor in the discrepant nature of the data. However, both teachers worked in urban schools; it is unclear if this was a determining factor in the flexibility provided to them regarding the curriculum.

In qualitative research, discrepant data reflect the fact that the themes of a study may not be universally applied (Ravitch & Carl, 2016). In this study, much of the discrepant data shed further light on Finding Number 5, which asserted that although participants in the study demonstrated beginning skills and strategies to differentiate instruction, they did so inconsistently and without complexity. In these discrepant cases, participants demonstrated more developed skills than their peers in some areas. It is

unclear if participant demographics played a role in these discrepant cases. It is possible that these teachers were on the higher end of a continuum of efficacy for certain skills and strategies for unrelated reasons. However, regardless of demographic variables, no participants were proficient in the complex process of DI.

Evidence of Trustworthiness

To contribute to a research field, a researcher must demonstrate quality and rigor to establish trustworthiness and confidence in a study's findings. In qualitative research, the characteristics of credibility, transferability, dependability, and confirmability establish trustworthiness (Lincoln & Guba, 1985). I implemented the strategies for establishing trustworthiness through these characteristics, without adjustment, as described in Chapter 3 (see Table 2) to establish confidence in the study's findings.

Table 2

Trustworthiness Strategies

Characteristic	Intended Result	Strategy
Credibility	Researcher answers the intended questions	Alignment of study components Member checking Thick description Interview protocol designed for open, honest responses Triangulation through wide range of informants Participants assured that confidentiality would be maintained Reflexive journaling
Transferability	A study's findings apply in different settings and contexts	Thick description; data and context described in rich detail
Dependability	Demonstrates stability of results over time	Strong research design and alignment Triangulation through wide range of informants Transparency through reflexive journaling
Confirmability	Establishes a measure of objectivity in research	Reflexive journaling to explore researcher bias Reflexive journaling to create an audit trail

Credibility

To establish credibility, I closely aligned the study components, including the problem, purpose, conceptual framework, research questions, interview protocol, and coding process (Ravitch & Carl, 2016). Also, because credibility involves ensuring that the results of the study are recognizable through the eyes of the participants (Lincoln & Guba, 1985; Nowell et al., 2017), I utilized member checking during the interview by asking participants questions to clarify their responses (Burkholder et al., 2016; Lincoln & Guba, 1985) and after the interview by providing preliminary study results for their review (Lincoln & Guba, 1985; Ravitch & Carl, 2016). Further, thick description, including the use of participants' words when sharing results, assures that the results do not stray from the research data and are therefore credible (Pilten, 2016; Ravitch & Carl, 2016). Finally, I established credibility through strategies that encouraged participants' honest answers, including ethical procedures, informed consent, assurance of confidentiality, non-judgmental interview questions and procedures, and an atmosphere of trust. Collectively, these strategies established credibility and provide confidence that the research questions are answered fully and appropriately.

Transferability

Transferability can be a difficult characteristic to establish in qualitative research, and in this study, in particular, because of the relatively small, non-random sample and a single source of data (Merriam & Tisdell, 2016). Further, a researcher cannot determine the transferability of his or her results to any other study (Lincoln & Guba, 1985; Shenton, 2004) due to the qualitative nature of the data. However, I have provided thick

description with contextual details in the study results and findings sections that allow future researchers to determine how the findings might apply to their research settings. By providing thick description, sufficient detail is provided to allow readers to properly understand the current study and confidently evaluate the extent to which the transfer of results and conclusions is appropriate for their research (Shenton, 2004).

Dependability

A researcher establishes the stability of a study's results over time through dependability. Being well-aligned, this study has strong dependability (Burkholder et al., 2016; Ravitch & Carl, 2016). In addition to the alignment of the research design, implementation of the research design has been described in detail, demonstrating that proper research practices have been followed, further supporting the study's dependability (Shenton, 2004). The practice of triangulation also supports dependability (Merriam & Tisdell, 2016; Ravitch & Carl, 2016). I used the triangulation strategy described by Shenton (2004) and Lincoln and Guba (1985), using a wide range of participants in comparable positions to form a rich description of the perceptions and classroom applications of DI demonstrated by novice teachers. Finally, reflexive journaling further established dependability by providing transparency in how decisions were made in the processes of data collection, transcription, and analysis (Ravitch & Carl, 2016). See Figures 1 and 2 for a representation of the progression of data analysis from coding through the development of findings.

Confirmability

To establish a measure of objectivity in the study, also known as confirmability, I documented strategies to establish objective results and mitigate potential researcher biases (Amankwaa, 2016). To this end, I provided objective reasons for theoretical, methodological, and analytical choices throughout the study (Nowell et al., 2017), including rationales for the conceptual framework in Chapter 2, methodological procedures in Chapter 3, and analytical processes in Chapter 4. I also demonstrated confirmability through a reflexive journal that identified researcher biases as they became evident, as well as ways to address any biases and how they might influence the data collection or analysis process (Merriam & Tisdell, 2016). I further supported confirmability by creating an audit trail, including raw data, annotated transcripts, contact summary notes, and a reflexive journal (Nowell et al., 2017). These strategies confirm that the study was conducted objectively and allow future researchers to understand how the findings were derived from the data and how they might follow the process in future research.

Summary

What follows is a summary of the answers to the study's research questions. Regarding Research Question 1, the first finding was that novice teachers perceived DI in much narrower terms than presented in the study's conceptual framework. They viewed DI as an activity, often independent, unlike the complex, interrelated process described by Tomlinson (2014). A second finding was that participants perceived factors outside of their control as an influence on their ability to apply DI effectively. The district or

school's prescribed curriculum was often perceived as a hindrance, and access to support personnel was perceived as essential to applying DI to meet students' needs. A third finding was that novice teachers perceived DI as overwhelming and frustrating to use effectively. They attributed this perception to the wide range of students' academic and behavioral needs and pressure on teachers to meet students' needs with limited flexibility allowed by district policy.

Regarding Research Question 2, Finding 4 was that participants worked hard to establish classroom conditions that facilitated DI. Participants formed relationships with students and worked toward student engagement, a lack of which could interfere with student learning. The fifth and final finding of the study was that although novice teachers experimented with many research-based strategies associated with DI, they were not yet proficient in the complex process of DI. For example, they demonstrated skills in some instructional decision-making and responsive teaching. However, they inconsistently considered student characteristics, often viewing academic ability as the primary characteristic considered for differentiating instruction, sometimes not acknowledging or addressing other types of diversity.

The findings for both research questions reflect broad representations of participants' perceptions and applications of DI. With few exceptions, participants reported similar experiences across grade levels, geographic characteristics, and types of schools. Triangulation to reveal patterns and commonalities within these characteristics was challenging. Within each category, the number of participants was considerably uneven, creating the possibility that observations were representative of only the

individual participants, not the category of participants. The most salient example of this was the fact that only one of the 12 participants was male. For that reason, I made no generalizations regarding male and female participants during triangulation. Triangulation based on the type of school was also subject to an uneven number of participants. Nine of the 12 participants were traditional public-school teachers, leaving only three participants to consider in non-traditional settings. Similarly, nine of the 12 participants taught in suburban schools, leaving only three participants to consider in urban schools. The grade level of teachers was also uneven, with four kindergarten teachers and half of the participants at the primary level of kindergarten and first grade. The unevenness of participants in each category limited the value of any generalizations made during triangulation.

In Chapter 5, I present an interpretation of the findings related to the literature review described in Chapter 2 and the conceptual framework of the study. I discuss limitations to trustworthiness. I then will provide recommendations for further research and the potential impact for social change resulting from the study.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to explore how novice teachers perceived and applied DI in their kindergarten through fifth-grade heterogeneous classrooms. The importance of novice teacher application of DI is underscored by DI's established positive impact on student learning (Coubergs et al., 2017; Valiandes, 2015), the recognition of the effects of teacher experience on student success (R. Garrett & Steinberg, 2015; Kini & Podolsky, 2016) and the increasing levels of diversity in modern classrooms (National Center for Education Statistics, 2019). There is a gap in practice indicating that novice teachers do not use research-based applications of DI effectively. There is also a gap in the research regarding novice teachers' use of DI, specifically a lack of qualitative studies. As a result, there is an insufficient understanding of how novice teachers perceive and apply DI. I conducted this study to explore the gap in practice and address the gap in research.

I conducted a general qualitative study using one-on-one, semistructured interviews to explore the concept of DI through novice teachers' views. The study included novice teachers from various settings, including public and private schools, in five different states and seven different school districts. Participants were asked open-ended questions informed by the conceptual framework, which was based on the seminal works of Tomlinson (2014) and Vygotsky (1978). In-depth accounts of participants' experiences and perceptions were collected and coded to identify recurring patterns and themes. Participants' own words, organized through codes, categories, and themes, formed the basis for the study's findings.

Interpretation of the Findings

What follows is an interpretation of the findings compared with the conceptual framework and the peer-reviewed literature found in Chapter 2. The following sections are organized by research question and finding.

Research Question 1

What are novice teachers' perceptions about DI in their kindergarten through fifth-grade heterogeneous classrooms?

Finding 1. The first finding of this study was that novice teachers perceived DI as comprised of discrete instructional strategies rather than a comprehensive approach to educating students, a perception that did not align with the conceptual framework. Participants in this study seemed to interpret DI as an activity to keep students on task and occupied with learning activities within their ZPD. However, this approach to DI occurred outside of a holistic approach to learning. This interpretation was evident in teachers' descriptions of worksheets, packets, leveled books, and computer games, often assigned to students after a whole-class assignment had been completed. The teachers viewed the materials themselves as differentiation. Additionally, the materials and tasks were frequently completed independently and were often intended to occupy students while teachers worked with other students in small groups.

This perception of DI by novice teachers as a separate component from instruction, such as a material or task, aligns with novice teachers' perceptions reported in current literature. Brevik et al. (2018) noted that teachers often considered only content-level adjustments in their attempts to differentiate instruction, providing

additional practice for lower-achieving students and advanced concept building for high-achievers. Pozas et al. (2019) also reported that teachers frequently used simple DI practices that required less preparation. They proposed that teachers may have done so because they lacked the time or felt unprepared to meet diverse student needs, though it is also possible they lacked knowledge on how to differentiate. Regardless of the reason, the practice is common and does not reflect the interpretations of DI in current literature or in the conceptual framework of this study.

Tomlinson (2003, 2014) advocated for a complex, challenging, responsive teaching model to operationalize DI, which does not support the idea of using worksheets or computer programs only loosely related to a comprehensive instructional program. Though studies published before 2011 operationalized DI as individualized worksheets and discrete activities (Bondie et al., 2019) in the literature review for the current study, comprised primarily of studies from 2015 to the present, no studies operationalized DI in this way. Instead, Jones (2019) characterized DI with a focus on a teacher's behavior, not a specific strategy or tool. Bondie et al. (2019) advocated for a reframing of DI, shifting from a focus on specific instructional activities to a focus on teacher decision making. The distinction is important because, as Park and Datnow (2017) asserted, the way teachers define DI influences the practices they apply. The participants in this study often defined DI very narrowly, reflecting a more traditional perception of DI and limiting how they applied it.

The use of technology to support DI, primarily using students' ZPD, has been discussed in the literature as well. Vygotsky's (1978) concept of ZPD has been applied

effectively to support student learning through adaptive technology (Bahçeci & Gürol, 2016; Xu & Warschauer, 2019). However, it is not uncommon for the technologies supported by schools or districts to consist of discrete activities that lack alignment with their literacy or math programs (Wilcox et al., 2015), diminishing the comprehensive nature of DI. This lack of alignment was the case for participants in the current study as well. But schools that have selected and used technology tools that aligned with curriculum achieved better student results (Wilcox et al., 2015). In these cases, contradictory to the present study, technology connected directly to math and literacy programs, providing assessment data to drive instructional decisions, guide interventions, and inform resource allocation, all characteristics of a comprehensive DI program. In these ways, research has confirmed that it is possible to use adaptive technology to differentiate instruction. However, because of a lack of alignment, the ways current study participants used technology were likely less effective than they could have been.

Novice teachers' perceptions of DI as narrow instructional strategies has repercussions for students in the classroom. When novice teachers use discrete strategies, such as worksheets, tasks, and technology, in ways that are not woven into a more comprehensive program, the value of DI is minimized. Students may not find success as readily as in classrooms with an expanded definition and operationalization of DI.

Finding 2. The second finding was that novice teachers in this study attributed the extent of their implementation of DI to multiple factors outside of the sphere of their control, such as the prescribed curriculum and the availability of support personnel to provide instructional intervention for students. Teachers often had a variety of outside

influences and circumstances such as these that affected their instructional practices. Participants found that both school and district level policies and the resources provided to teachers both supported and restrained the ways they used DI.

Prescribed curriculum. The influence of a prescribed curriculum in the present study aligns with current research regarding DI. For example, Park and Datnow (2017) found that the curriculum adopted at the district or school level both helped and hindered DI, in part because the materials and support provided to teachers shaped their decision-making. The way the curriculum defined DI influenced the teachers' definition of DI, which was true for my study participants. The emphasis placed on DI by the curriculum, or lack of such, either supported or deterred teachers' DI application. Kaur et al. (2019) agreed that curricular decisions made at higher levels in the educational system affected what teachers did and were expected to do related to DI. Further, Scales et al. (2017) found that novice teachers, such as those in this study, dealt with a prescribed curriculum in multiple ways to reconcile the curriculum with their perceptions of DI. Some followed the curriculum with fidelity, others supplemented the provided materials, and, rarely, some freely adapted the curriculum to support student learning. These varied approaches align with my findings. The variations in approach by novice teachers may be explained by the variable amount of autonomy given to teachers to adapt the curriculum beyond school or district specifications.

Support personnel. One resource sometimes provided to teachers is access to individuals who provide instructional support in or out of the classroom (RTI Action Network, 2019). Participants in the current study described co-teachers, reading

specialists, ELL teachers, math interventionists, and paraprofessionals providing support in the classroom. Most current studies exploring teachers' use of DI did not address the presence of additional adults in the classroom other than the classroom teacher to provide support for student success. However, support personnel could be considered a component of RTI, a multi-tiered intervention program (RTI Action Network, 2019). Though novice teacher participants did not mention the term RTI, their description of additional adult supports suggested such a program. RTI targets support for individual students, beginning with evaluation by the classroom teacher and leading to specific interventions. RTI consists of three levels of instruction and intervention, the first provided by the classroom teacher through a high-quality core curriculum. Tier 2 interventions are provided through DI, and Tier 3 interventions become increasingly intense and individualized to meet students' instructional needs. Although RTI at all levels may be conducted by a classroom teacher, Level 2 and 3 interventions may be provided by support personnel (RTI Action Network, 2019).

The inclusion of a wide range of abilities and identified disabilities requiring intervention in their classrooms left novice teachers in the current study feeling that additional support personnel were necessary to meet students' diverse needs. Because they struggled with even the Tier 1 interventions required of classroom teachers, they used support personnel to facilitate these first-level interventions, in addition to secondary and tertiary interventions. This struggle is not surprising given that student teachers have expressed low levels of confidence in meeting the needs of struggling readers, ELLs, and students with disabilities placed in mainstream classrooms (Meeks et

al., 2016). Pre-service teachers working in general education classrooms have similarly reported a lack of confidence in using RTI to assess and intervene in cases where students required DI (Hurlbut & Tunks, 2016).

Finding 3. The third finding of the study was that novice teachers consistently described DI as overwhelming and frustrating to apply effectively. They described wide ranges of academic needs and student behaviors that limited the instructional approaches they felt they could use in the classroom, including DI. At the same time, participant teachers shared that sometimes, when they understood why and how to incorporate DI, they were deterred from doing so. Most did not have the autonomy to adjust the timing of their lessons or the materials they used. The combination of the pressure to meet overwhelming student needs and the limitations placed on them shaped novice teachers' perceptions of DI as difficult to carry out (see also Helms-Lorenz and Maulana (2016).

This perception about DI aligned closely with current literature. Lavania and Nor (2020) reported the barriers to DI as expressed by teachers: student needs, curriculum, class size, time constraints, and preferred teaching styles. Each of these barriers served as a point of frustration for participants in this study. Gaitas and Martins (2017) also reported survey data in which teachers described multiple components of DI as "very difficult" (p. 548). These components included the adaptation of instruction based on student profiles, progress monitoring assessment, and scaffolded instruction, all key factors associated with effective DI. Additionally, Tomlinson (2016) described these characteristics that served as challenges to teachers: wide variations in student academic skill levels, curriculum mandates, and minimal administrative support. This research

discussed many of the elements that served as a source of frustration for most participants in this study. Thus, data from the current study corroborated the findings of current literature.

Though characteristics that served as barriers for participants in this study were consistent with the current literature, it is unclear if the reasons for the barriers they experienced were consistent with those described by participants in previous research. Bruno et al. (2019) found that the schools in which novice teachers were placed tended to have more challenging students in terms of increased behavior issues and lower academic achievement levels. These placements created a higher instructional burden on novice teachers than on their more experienced peers, potentially exacerbating barriers to the effective application of DI. Additionally, Goldhaber et al. (2017) found that novice teachers experienced greater barriers when the demographics of the school in which they completed their student teaching differed from the school in which they were hired for their first formal teaching position. Several researchers have also suggested that barriers resulted from insufficient preparation in teacher certification programs, a barrier mentioned by only a few participants in the present study. Teachers in this study and previous research did not report feeling ill-prepared to apply DI except for cultural diversity (Hurlbut & Tunks, 2016; Meeks et al., 2016; Suprayogi et al., 2017). Rather, they perceived that the conditions of teaching were their greatest barrier. However, the reasons for the barriers, such as the placements and preparation of novice teachers, were beyond the scope of the present study.

Although novice teachers in the present study described DI as overwhelming and frustrating to apply effectively, they exhibited an intense commitment to DI. Although some researchers described novice teachers who did not see the value in using DI to meet students' needs (Dack & Triplett, 2019; Griffith, 2017), that was not true for the participants in this study. All participants demonstrated a commitment to meeting students' needs. Tomlinson (2014) asserted that "every child is entitled to the promise of a teacher's optimism, enthusiasm, time, and energy, a teacher who will do everything possible, every day, to help students realize their potential" (p. 36). Participants in this study had a strong desire to fulfill these requirements. They understood many of the tenents of DI. However, despite their desire, they could not apply them in complex ways in the classroom. Novice teachers understand the need to differentiate instruction and have the desire to do so but may not be equipped with the deep knowledge and sophisticated skills required (Brevik et al., 2018).

Research Question 2

What instructional practices do novice teachers describe using to promote the success of their students in kindergarten through fifth-grade heterogeneous classrooms?

Finding 4. The fourth finding of the study was that novice teachers fostered affective conditions that facilitated the potential use of DI in the classroom. These conditions included meeting students' affective and emotional needs, such as a safe learning environment, affirmation, and acceptance, and the need for learning to be relevant and fun for students. Novice teachers addressed these needs by developing caring relationships and incorporating ways to increase student engagement. Though

these efforts created positive classroom environments, they did not address the specifics of DI, as described in the conceptual framework. However, they did increase the potential for the use of DI.

Relationships. The idea that teachers value fostering relationships with students in the classroom aligns with current literature. Both Kibler et al. (2019) and Jones (2019) expressed that teachers felt their knowledge of students as individuals was of profound importance in facilitating learning. Like the participants in this study, Brevik et al. (2018) found that novice teachers believed it was essential to get to know students to design differentiation. A quote from a participant in Jones's study closely resembled a quote from a participant in this study:

> I had to learn right away that learning wasn't going to happen that day unless there were a variety of other things met first. Whether they felt safe, whether they felt respected, whether they felt that, all of those things, teaching just wasn't going to happen (p. 28).

Participant 8 in the current study said,

> You're not going to listen to somebody if you don't care about them, and you know they don't care about you. So, kind of making sure that we have that safe environment and that caring environment definitely helps to make sure that they are going to learn from me.

To explain why novice teachers might focus on relationship building as a prerequisite to DI, van der Lans et al. (2018) established progressive developmental stages regarding what teachers focused on in the classroom. The first and second phases

included creating a safe learning environment and effective classroom management. It was not until the third phase that the researchers included the quality of instruction and the use of DI. Based on the interview data, novice teacher participants emphasized the first two phases, similar to those in the study by van der Lans et al.

Student engagement. The literature also supports student engagement to facilitate the complex use of DI. Macy (2016) used language and movement through drama to engage students and then worked within their ZPD to facilitate literature instruction. Cress and Holm (2016) studied classrooms where teachers provided various media and allowed students to make choices based on interests to engage students in the learning process. In my study, novice teachers viewed engagement primarily through a lens of emotional engagement, as described by Pedler (2019). Pedler defined emotional engagement as how a teacher interacts with students to create an environment in which students' positive feelings facilitate learning. Part of this approach involved developing student relationships. However, the most relevant component of Pedler's definition of engagement was bringing fun and humor to the classroom. As in the research of Cress and Holm, novice teacher participants used techniques to bring joy to the process of learning. Participants in this study facilitated many prerequisites to DI. However, the next step, the application of DI, was not always effective. I address the proficiency of novice teachers in the application of DI in the fifth finding.

Finding 5. The fifth finding of the study was that novice teachers used multiple research-based strategies to differentiate instruction in the classroom but were not yet proficient in the complex process of DI, as described by Vygotsky (1978) and Tomlinson

(2014). Of note were the ways novice teachers addressed student characteristics, instructional decision-making, and responsive teaching. Also of note was novice teachers' commitment to meeting student needs through DI.

Student characteristics. Tomlinson (2014) created a model of DI designed to consider students' multiple characteristics, such as academic ability, background knowledge, race, ethnicity, culture, and linguistic differences. In this study, two characteristics stood out as examples of ways novice teachers lacked proficiency in DI: consideration of academic ability and race/culture. First, when using DI with students of different ability levels, novice teachers addressed the needs of lower-performing students more often than those of higher-performing students. Second, the consideration of the characteristics of race and culture were overwhelmingly absent from teachers' efforts to differentiate instruction.

Academic ability. When asked how they met their students' needs, these novice teachers consistently addressed academic needs before all others. Teachers grouped students most frequently homogeneously to address specific, ability level needs, or heterogeneously so that students at different cognitive levels would have the opportunity to work together. Teachers designed instructional activities primarily for a range of cognitive levels and spent much of their time working with students at lower achievement levels.

The novice teachers in this study tended to consider academic ability as the primary factor for differentiation. This tendency was also found by Civitillo et al. (2016), who asked teachers to describe categories of student diversity they viewed as relevant in

the classroom. Although teachers described individual students with diverse characteristics, the way they organized learning in the classroom focused primarily on academic ability. Civitillo et al. noted that academic priorities superseded other potential areas of differentiation. Participants in the current study also prioritized academic qualities when differentiating for students.

More specifically, in the current study, teachers focused on the needs of lower-achieving students more than the needs of higher-achieving students. Current literature also reflects this phenomenon. Ritzema et al. (2016) found that more attention was provided to weaker students, as measured by the time spent in small homogeneous groups, the amount of teacher talk directed at weaker students during whole group instruction, and the amount of individual attention those students received. Freedberg et al. (2019) also documented a smaller allocation of time for highly able students.

Recent attention to standardized testing and district policies for students to achieve proficiency in math and reading (Morgan, 2016; Zoch, 2017) may have played a role in this focus on lower-level learners. In fact, novice teachers in the current study expressed that the expectation was for them to teach to students performing below proficiency on standardized tests. As a result, the focus on academic ability when differentiating instruction may have contributed to a lack of attention to race and culture as a consideration of DI (Milner, 2017).

Race and culture. Despite students' racial and cultural diversity in their classrooms, novice teachers in this study rarely used the characteristics of race or culture to differentiate instruction in the classroom. Further, despite research documenting

cultural influences in the way students prefer to learn, such as group versus independent work, competitive or cooperative motivation, preference of expressive or reserved communication (Alberta Education, 2010; Moule, 2012), the novice teachers discussed no knowledge or consideration of these cultural learning profiles. Most expressed that culture did not play a role in designing instruction; some expressed hesitation in doing so.

Dack and Tomlinson (2015) suggested that teachers expand their appreciation of cultural differences by recognizing and appreciating these differences and learning about culturally influenced learning patterns. Despite Dack and Tomlinson's assertions that students' learning patterns are manifestations of cultural experiences, novice teachers in the present study did not reflect this in their teaching. This lack of consideration of culture demonstrated an unawareness of the ways culture shapes learning and teaching (Dack & Tomlinson, 2015; Moule, 2012). Failure to include the characteristic of culture in DI is consequential because Wilcox et al. (2015) reported that culturally diverse schools whose teachers had skills to differentiate instruction based on cultural characteristics performed better than those without such skills.

Tomlinson (2014) described different levels of complexity in DI related to culture through two examples. In the first, representative of participants' actions, teachers emphasized discrete events or topics such as Women's History Month, Black History Month, or the celebration of religious holidays. Participants 1 and 12 expressed just this approach. In a more complex scenario, students might explore topics recursively through the year through "multiple historical lenses such as culture, economics, and gender

groups" (Tomlinson, 2014, p. 12). Participants did not report this type of complex scenario.

The hesitation of teachers to address culture and race in the classroom aligns with current literature. Coles-Ritchie and Smith (2017) engaged teachers in discussions about race and culture in schools. They found that teachers, White teachers particularly, felt uncomfortable having conversations about race in their classrooms. The researchers asserted that teachers avoided these conversations because they found them to be emotional. Similarly, Alvarez and Milner (2018) found White teachers to be uncomfortable with any race conversations in the classroom. Many participants in the current study, all of whom were White, shared similar feelings.

The fact that novice teachers are not actively participating in culturally responsive teaching belies its importance. There is considerable current literature about the way race and culture influence teaching and learning (Alsubaie, 2015; Ayscue et al., 2017; Gershenson et al., 2017; Lew & Nelson, 2016; Tomlinson, 2019), and novice teachers should be equipped with an understanding of such (Alvarez & Milner, 2018; Milner, 2017). Culturally responsive teaching (Bassey, 2016; Gay, 2018; Lew & Nelson, 2016) and critical race theory (Howard & Navarro, 2016; Ladson-Billings, 1998) are well-researched fields, and recent events in society, such as the Black Lives Matter social movement (Rickford, 2016), necessitate the need for novice teachers to meet the needs of students of all races and cultures.

Instructional decision-making. The decision to use student groups for DI was a relative strength for participants in the current study. Using student groupings to facilitate

DI effectively is a common practice (Tomlinson, 2014), and one used consistently by the novice teachers in the present study. Participants used flexible groupings, including homogeneous groupings based on interests and learning preferences, an effective practice advocated by Subban and Round (2015) and Tomlinson (2014). However, more often, they used homogeneous groups of students based on ability.

By using homogeneous ability groups, novice teachers operationalized Vygotsky's (1978) theory of ZPD in their classrooms and practiced DI based on readiness, as described by Tomlinson (2014). Like Ionescu (2019), participants created flexible groups based on readiness to understand a new concept. In each group, the teacher addressed the concept differently, based on the readiness of those students. Participants regrouped students for each concept. Like Cox (2018), participants also created groups according to reading readiness in which students read texts with the same content topic for all groups, but the readability levels varied from group to group, as a form of scaffolding.

Not all groupings used by novice teachers were effective. As in the research of Thorius and Graff (2018), study participants sometimes placed students with different ability levels together, with the expectation that higher-ability students would support lower-ability students. These heterogeneous academic ability pairings often benefitted lower-achieving students more than their higher-achieving peers. Although this approach enabled the less-capable students to learn through social interaction and peer support, it did not provide the same opportunity for the more-capable students, those ready to extend knowledge and skills beyond those taught in the general curriculum, to learn within their

ZPD. As noted by Fung and Lui (2016), collaborative groups were more effective with adults providing appropriate ZPD scaffolding for students in mixed-ability groupings than with peers. The expectation novice teachers held about the purpose of these pairings was also confirmed in the research of Park and Datnow (2017). Although heterogeneous groupings may support learning in other ways, teachers are not using DI effectively if the reason for forming the groups is to meet the needs of one group of learners and not another (Tomlinson, 2014). Park and Datnow also noted that the use of mixed-ability groups in this way did not reflect the goal of DI to meet the needs of all learners. Despite some participants using one ineffective type of grouping, most novice teachers in this study demonstrated strengths in using other effective groupings to differentiate instruction.

Responsive teaching. DI often requires teachers to act spontaneously in the classroom when students' needs become evident. Tomlinson (2003) called this type of DI "responsive teaching" (p. 6), although the phenomenon has been documented frequently in current research using different terminology (Ionescu, 2019; Macy, 2016; Reynolds & Goodwin, 2016). The importance of such responsive teaching is supported by many researchers (Jones, 2019; Macy, 2016; Tomlinson, 2003), including Ionescu (2019), who described it as the way a teacher monitors and determines the needs of students during the immediate process of learning. As opposed to the planned scaffolding described in the small reading and math ability groups described previously, interactional scaffolding is the responsive process of using the verbal and non-verbal cues of students to adjust instruction in the moment (Reynolds & Goodwin, 2016).

This type of responsive teaching was another area of strength for novice teachers in the present study. As in the study conducted by Griffith (2017), participants were able to make in-the-moment decisions and justify and reflect upon those decisions to their students' benefit. All participants described incidences of responsive teaching in which they felt they needed to address and meet students' needs, individually or in small groups. In most instances, participants described times where there was a barrier to learning, such as a misconception that needed to be clarified for students or a situation where the planned instruction was not producing the desired learning results. In these cases, novice teachers frequently used interactive scaffolding, as Reynolds and Goodwin (2016) described, as opposed to planned scaffolding that they would have designed ahead of teaching a lesson. Novice teachers readily acknowledged these responsive moments and responded appropriately. Notably, whereas Griffith found that some novice teachers did not recognize the need for responsive decision-making, a critical component of DI, this was not the case for novice teachers in the current study.

Limitations of the Study

I acknowledge that the current study has limitations. Characteristics of the study's sample contribute to the limitations. First, the sample size of the study was small, with 12 participants. Although sample sizes such as this are common in qualitative research (Guest et al., 2006; Hennink et al., 2016), and data saturation was reached, the sample size presents the possibility that findings may not be generalizable to the larger population of novice teachers (Ravitch & Carl, 2016). Another sample characteristic limiting the study's generalizability is the lack of racial diversity in the group of

participants. All the novice teacher participants in the current study were White. This characteristic was an unintentional result of the recruitment process, which did not include a participant's race in the participant criteria. Despite other varying characteristics achieved through purposive sampling, such as private and public-school teachers, urban and suburban schools, and various grade levels represented, racial characteristics were highly homogeneous. This study reflects only the perspectives of White teachers and is not generalizable across the population of novice teachers. Additionally, though the recruitment process included utilizing national databases, all participants who volunteered for the study were located in the Eastern portion of the United States, limiting generalizability to other areas of the country. For these reasons, an approach using maximum variation sampling may have been more effective in increasing generalizability by ensuring the participation of geographically and culturally diverse individuals (Burkholder et al., 2016; Lyons et al., 2013).

Another limitation of the study was the nature of the data collection tool. The open-ended nature of the interview questions allowed participants to influence the direction of the interview. As a result, participants may not have addressed all relevant constructs of the conceptual framework, despite my use of clarifying questions during the interview. Instead, a survey or questionnaire could have resulted in data collection that more consistently addressed the constructs (Burkholder et al., 2016). Additionally, there was only one source of data. Other sources of data, such as classroom observations or lesson plan documents, could have increased the study's dependability.

Finally, because the nature of qualitative research is to explore participants' thoughts, feelings, and experiences, bias is a potential limitation when a researcher's thoughts, feelings, and experiences affect the research process (Ravitch & Carl, 2016). Because I was a novice teacher in the past and knowledgeable about DI, there was the potential for researcher bias. To help mitigate such bias concerns, I designed the interview protocol for the current study to provide clear questions and guidelines to focus the interview on the collection of relevant data and reduce the researcher's subjective views from entering the interview process (Burkholder et al., 2016; Thomas, 2017). Additionally, I used neutral terms and impartial responses during the interviews to minimize the influence of my views on the contributions of participants (Rubin & Rubin, 2012). There was also the potential for researcher bias during data analysis and interpretation, so interviews were recorded and transcribed to provide the most accurate representation of the collected data. Further, member checking techniques were used during and after data collection and analysis to ensure the validity of the data (Burkholder et al., 2016; Ravitch & Carl, 2016). Although limitations can impede a study's trustworthiness, these strategies helped mitigate the impact of the limitations on the study results.

Recommendations for Further Research

To extend the findings of the current study, I offer three recommendations. First, I recommend further study of how the theory-to-practice component of teacher development can be strengthened for novice teachers. The current study corroborated that novice teachers do not apply DI with complexity but did not address why this is the case.

The lack of complex application may have result from inadequate training in DI that leaves novice teachers without the knowledge and skills they require. Alternatively, it may have resulted from a lack of ability to apply DI theory in authentic teaching settings. Hurlbut and Tunks (2016) found that teachers had trouble transferring the theory they learned about DI in teaching methods courses into their practice as novice teachers. Similarly, Dack and Triplett (2019) found that despite comprehensive training in Tomlinson's (2014) model of DI during pre-service coursework, teachers did not apply DI in their classroom during their first 2 years of teaching. If novice teachers cannot transfer theory into practice regarding DI, the nature of the training related to DI in which novice teachers participate should be studied. Strom and Viesca (2020) advocated for a more complex framework to examine the relationship between teacher learning and teacher practice, and such a framework may be appropriate to guide theory-to-practice research regarding novice teachers.

Second, I recommend further study into the application of DI by novice teachers in the classroom using additional forms of data. Although the current study utilized self-reports of DI, further study could expand and clarify these applications through classroom observation and document analysis to corroborate teacher reports. Such studies might also include exploration of whether the applications of DI teachers reported were, in fact, successful in supporting the success of students in the classroom. Pozas et al. (2019) and Kaldi et al. (2018) made these recommendations regarding the study of the use of DI by teachers at all levels; I recommend a similar focus on novice teachers.

Finally, I recommend further research to explore how school and district policies influence novice teachers' perceptions and applications of DI. The current study revealed that factors outside of teachers' control influenced how they applied DI in the classroom. Limitations on curricular materials and timelines were of concern to participants in the current study. Other factors outside of teachers' control that influence DI may include the way schools place students in classes and how schools assess student learning. The methods used to place students in classes may assign a higher instructional load on novice teachers, impeding DI (Bruno et al., 2019), and the use of standardized testing may pressure novice teachers to put aside DI and focus singularly on student success by that measurement (Morgan, 2016; Zoch, 2017). These two impediments to DI for novice teachers were not fully considered in the present study. An additional factor at the district and school level that may be impeding novice teachers' use of DI is a discrepancy between the way administrators and teacher mentors define and operationalize DI and current research about the complex nature of DI. If those who support novice teachers are not fluent in DI theory and practice, their influence may deter effective practice by novice teachers.

Implications and Recommendations for Practice

The findings of this study have the potential to increase novice teachers' effective use of DI and thereby increase student access to quality teaching and learning in diverse elementary classrooms. Researchers have established that students, particularly students with wide ranges and multiple aspects of diversity, should receive high-quality instruction every year, regardless of their teachers' years of experience (R. Garrett &

Steinberg, 2015; Kini & Podolsky, 2016; Valiandes, 2015). Further, researchers have established that novice teachers are often not skilled enough to do so (McLean & Price, 2019; Staff Development for Educators, 2019; van der Lans et al., 2018). Based on the current state of diversity in classrooms, novice teachers are obligated to practice DI with great skill to meet a wide variety of student needs. Yet, there is a gap in practice between how novice teachers perceive and apply DI and how it is defined in current research. This gap is reflected in the present study. Novice teachers did not apply DI with great skill or complexity, as described in the conceptual framework. The limited application of DI by novice teachers in the current study is of great concern.

To address this gap in practice, I offer the following recommendations for actions that can strengthen novice teachers' application of DI and thereby improve student learning:

1. At the school level, those who support novice teachers, such as administrators and mentors, should examine their guidance to ensure that teachers have what they need to apply DI effectively. These needs may include access to professional development addressing the theory and practice of DI.
2. Novice teachers should be provided with opportunities to observe and discuss the complex process of DI with skilled teachers, with attention to instructional decision-making. They should then have opportunities to apply DI and receive feedback on their attempts.

3. Novice teachers should be provided curricular materials that provide both instructional guidance and instructional flexibility needed to apply DI skillfully in the classroom.
4. Of critical importance, novice teachers should receive professional development to support culturally responsive teaching. They should be provided with opportunities to observe teachers successfully applying DI related to race and culture and opportunities to use such practices in their own classrooms.

Should these recommendations be put into action, the shortcomings in novice teachers' perceptions and applications of DI could be strengthened. As a result, novice teachers may perceive DI as a holistic, comprehensive approach to teaching rather than discrete instructional strategies. They may find that curricular materials provided to them support all aspects of DI in the classroom. They may learn to manage diverse students more skillfully, without extensive use of support personnel. Their strengths in establishing pre-conditions of DI can be followed with effective instruction. They may no longer perceive DI as overwhelming and frustrating. Ideally, they will use Vygotsky's (1978) and Tomlinson's (2014) frameworks to improve teaching and learning and meet diverse student needs.

Conclusion

Novice teachers enter the teaching profession each year and find challenges in meeting students' needs in their classrooms. As diversity in our society increases, as well as expectations placed on schools, so do the multitude of student characteristics that

influence teaching and learning in heterogeneous classrooms. The research-based practice of DI is a valuable approach for meeting student needs. However, there has been an insufficient understanding of how novice teachers perceive and apply DI in kindergarten through fifth-grade heterogeneous classrooms. This study was designed to explore the perceptions and applications of DI by novice teachers to help guide them, and those who support them, in creating effective teaching and learning experiences that maximize student success.

The constructs of Vygotsky's (1935, 1978) sociocultural theory and Tomlinson's (2014) model of DI were used to define DI and provide structure for answering the research questions. This conceptual framework was also used to guide the questions for the semistructured interviews. The collection of data served to explore the thoughts of novice teachers related to their perceptions and applications of DI. Data analysis suggested that novice teachers were only in the beginning stages of understanding and applying DI, as described by Vygotsky and Tomlinson.

Data from the present study both aligned with and extended current research regarding novice teachers and DI. Consistent with recent literature, novice teachers did not appear to use the complex practice of DI and may not be meeting the needs of diverse students in their classrooms. However, the current study revealed that novice teachers demonstrated beginning understandings and applications of DI and were committed to meeting their students' needs, even if they did not yet fully understand how to do so using DI. The greatest influence on novice teachers' ability to apply DI appeared not to be their perceptions of DI but rather the conditions in which they worked. The positive

indicators of novice teachers' early understandings and commitment to DI, as identified in the current study, suggest that improvement of DI practices by novice teachers is likely under certain conditions.

Novice teachers should be skillful with their teaching from the beginning of their teaching careers. For that to happen, novice teachers need the right support before and during their early days as teachers. This support includes opportunities for novice teachers to develop an understanding of DI's complex nature and assistance with the transition of DI theory to DI practice. This support also includes evaluating policies and practices of schools and school districts to promote those that encourage and allow for DI and reexamine those that do not. Given the current perceptions and applications of DI by novice teachers, with the right conditions, they have the potential to use DI to be highly effective teachers who meet the needs of their diverse students.

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Appendix A: Interview Protocol

The following interview questions are aligned with the research questions that guide the study. Each participant was interviewed and recorded using semistructured interview questions in-person or via Skype.

Participant 1_____

Opening Statement: Hello _____, thank you for voluntarily participating in my research study and answering a few questions. Again, thank you for signing/returning the consent form. To remind you, I will be recording the entire interview to help me capture your thoughts. With your permission, may I start the recording? I would like to understand more about you and how you teach, especially the ways you meet students' needs in the classroom. To begin the interview:

1) Tell me a little about the students in your current classroom.
2) Tell me a little about your teaching style (instructor-led, student-centered).

The remaining questions align with the research questions:

1. What are novice teachers' perceptions about DI in their kindergarten through fifth-grade heterogeneous classrooms?

Theoretical Construct	Aspect of RQ 1	Interview Question
Tomlinson: With DI instruction is adapted for student diversity (readiness, learning profile, interests)	Study construct: Contemporary classrooms have a wide range of diversity	3. Describe student diversity in your classroom? What other differences do you see among students?
Tomlinson: DI enables teachers to meet the individual needs of students	Study construct: DI requires a range of methods	4. What do you believe are the best methods to use to meet the needs of students in your classroom?

2. What instructional practices do novice teachers describe using to promote the success of their students in kindergarten through fifth-grade heterogeneous classrooms?

Theoretical Construct	Aspect of RQ 2	Interview Question
Vygotsky's sociocultural theory: learning and development are mediated by social interactions	Study construct: Social interaction in the classroom	5. What types of opportunities do students have to interact with each other? 6. In what ways do these opportunities support student learning? 7. In what ways do students interact with you? 8. How do you support student learning with these interactions?
Vygotsky's sociocultural theory: Zone of Proximal Development	Study construct: Determining students' independent ability and ability with assistance from others	9. When you start a new unit or concept, how do you determine what students know or are already able to do? 10. How do you use what you find out to support student learning?
Tomlinson: DI considers student readiness, learning profile, and interests.	Study construct: How teachers incorporate these student characteristics	11. What student characteristics do you think about when you plan lessons? a. How do students' race and culture influence planning? b. How does cognitive development influence planning? c. How does the socioeconomic status of students influence planning? d. How do the presence of ELLs in the classroom influence planning?
Tomlinson: DI involves adjustment of content, process, and product	Study construct: How teachers adjust curriculum	12. In what ways do you make changes in your teaching practices to meet the needs of different students? a. In what ways do you change the way you teach? b. In what ways do you adjust the materials you use? c. In what ways do you adjust assessment?
Tomlinson: Di involves responsive teaching	Study construct: How teachers adjust in-the-moment teaching	13. Please tell me about a time when you needed to make changes to a lesson on the spot? Why was that?
If time permits, additional questions that gain insight into perceptions about and applications of DI.		14. What do you think are some impediments to meeting all students' needs in the classroom? 15. Please describe an ideal classroom or curriculum that would allow you best to meet student needs.

Possible Interview Follow up Questions:

- Please give me an example of ….
- Please tell me more about…
- Please describe your process or procedure for…

Final Question:

13) What else would you like to add?

Concluding Statement to Participant:

Thank you for participating in this interview. I will be in contact via e-mail to share the study's initial findings. You will also have access to the completed report, if you would like. If you have any questions about the process or results, you may reach out to me at XXXXXXXX. Again, thank you for your time.

Appendix B: Interview Intake Form

<table>
<tr><td>Name:</td><td></td><td>Contact E-mail:</td></tr>
<tr><td>School:</td><td></td><td>Contact Phone:</td></tr>
<tr><td>How long teaching there?
Any additional full-time teaching?</td><td></td><td rowspan="5">Contact Points

E-mail contact:

Phone conversation:

Interview:

Follow-up e-mail:

Thank-you card sent:</td></tr>
<tr><td>Grade:</td><td></td></tr>
<tr><td>Self-contained?</td><td></td></tr>
<tr><td>Where certified?</td><td></td></tr>
<tr><td>Path to Certification:
4-year, MAT, AACC courses</td><td></td></tr>
<tr><td>Familiar with Skype?
Business or Web-based?</td><td></td><td>Mailing Address:</td></tr>
<tr><td>Schedule date and time:</td><td></td><td>Target or Starbucks?</td></tr>
<tr><td colspan="3">Next step:
Follow-up e-mail w/ confirmation of date/time
Link to skype
Informed Consent form</td></tr>
<tr><td colspan="3">Referred by/from:</td></tr>
</table>

Appendix C: Contact Summary Form

Name:

Date:

What were the main issues or themes (concepts) that struck you in this contact?

Summarize the information you got (or failed to get) on each of the target questions

RQ1: Perceptions	
RQ2: Applications	
Impediments	
Ideal Conditions	

Anything else that struck you as salient, interesting, illuminating, or important in this contact?

What new (or remaining) target (probing) questions do you have in considering the next contact with this site?