# THE CORRELATION BETWEEN SELF-EFFICACY, DIFFERENTIATED INSTRUCTION, AND GIFTED TRAINING IN SCHOOLS SERVING STUDENTS ORIGINATING FROM UNDER-RESOURCED HOMES

by

Amy Dean O'Dell

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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APPROVED BY:

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## ABSTRACT

Teachers face the challenge of meeting diverse learners' academic needs. Many learners from historically underrepresented student populations enter school with varying exposure to quality learning opportunities creating an academic gap and affecting gifted identification. Differentiation moved to the forefront of education as part of the response to intervention process and to meet gifted learners' academic needs. However, many teachers may feel ill-equipped to address a wide range of ability levels. The classroom's diverse and dynamic nature required efficacious teachers prepared to differentiate instruction effectively. The purpose of this bivariate correlational study was to examine the relationship between teachers' self-efficacy, teachers' perceptions and frequency of use of differentiated instruction, and gifted endorsement for teachers in northwestern South Carolina whose districts serve a large student population originating from under-resourced homes and who also offer gifted programming. The sample consisted of 108 teachers from four districts. Bandura's self-efficacy theory and Tomlinson's differentiated instruction model guided the study as they relate to teachers' perceptions and frequency of use of differentiation and training. Self-reported data from Likert-type surveys assessed teachers' sense self-efficacy as measured by the *Teachers' Sense of Self-Efficacy Scale* and perceptions and frequency of use of DI practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey*. Bivariate linear regression analyses indicated that gifted endorsement did not predict teachers' sense of self-efficacy, did not predict teachers' perceptions of differentiated instructional practices, and did not predict teachers' frequency of implementation of differentiated instructional practices.

*Keywords*: differentiated instruction, gifted, poverty, underrepresentation, self-efficacy.

## Dedication

This manuscript is dedicated to my loving family whose support made my dream of earning a doctoral degree a reality. To my husband Ron, you endured long hours of rewrites, delayed dinner plans, and occasional tears and yet remained positive and supportive throughout my doctoral journey. To my daughter Kate, thank you for giving me something to chase after, for modeling "how it's done", and serving as my sounding board. To my son Jack, thank you for being my voice of reason, hiking and running partner, and calming presence.

I must also reflect on where my dream began—my grandfather and my parents. My grandfather, Haynie Dean, instilled in me the value of hard work, following Christ's example, and value of a good education. To my parents, Sonny and Lillian Dean, I am eternally grateful for the long hours of reading to me as a child and answering my endless questions. You worked long hours and held multiple jobs to provide Laura, April, and I the opportunity to attend college. I pray I continue to follow your example and instill in my children and future grandchildren a love of knowledge and a Christ-like example.

I would also like to thank the Father. Many nights I felt discouraged and exhausted and turned to Him in prayer. He provided comfort, guidance, and clarity when I needed it most and gave me the strength to "run my race".

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I would be remiss if I did not acknowledge the contributions of Dr. Rebecca Lunde, my Chair and Dr. Jessica Talada, my Committee Member. Dr. Lunde, thank you for being a voice of reason and “reeling me in” when I expanded my study beyond the intended scope. Dr. Talada, thank you for your guidance and input on my manuscript throughout the proposal and dissertation defense.

## Table of Contents

## List of Tables

## List of Figures

## List of Abbreviations

Cognitive Abilities Test (CogAT)

Culturally and Linguistically Diverse (CLD)

Differentiated Instruction (DI)

Differentiated Model of Giftedness and Talent (DMGT)

Individuals with Disabilities Act (IDEA)

Iowa Assessments (IA)

National Association for Gifted Children (NAGC)

National Center for Education Statistics (NCES)

No Child Left Behind (NCLB)

Opportunities to Learn (OTL)

Response to Intervention (RtI)

South Carolina Department of Education (SCDE)

Statistical Packages for the Social Sciences (SPSS)

Supplemental Nutrition Assistance Program (SNAP)

Temporary Assistance for Needy Families (TANF)

Teacher Education Program (TEP)

# CHAPTER ONE: INTRODUCTION

## Overview

Chapter One provides an overview of the research study focusing on teachers' self-efficacy and differentiated instruction (DI) perceptions and frequency of use among teachers with gifted endorsement. Chapter One includes background information on gifted education, gifted underrepresentation among students originating from under-resourced homes, and teachers' sense of self-efficacy as it relates to differentiated instructional strategies. The chapter also includes the problem statement, the study's purpose and significance, the research questions guiding the study, and concludes with definitions relevant to the study.

## Background

Today's classrooms serve students from increasingly diverse cultural and linguistic backgrounds and ability levels (NCES, 2019; Tomlinson, 2017). The classroom's growing diversity reflects both a shifting national demographic and legislative action (IDEA, 2004; NCES, 2019; NCLB, 2008). The Individuals with Disabilities Act (IDEA) and the No Child Left Behind Act (NCLB) implemented mandates that affected the educational landscape (IDEA, 2004; NCLB, 2008). Implementation of the IDEA component of using the least restrictive environment increased the range of student ability levels in the classroom (IDEA, 2004). The shift complied with students with special needs right to learn with their peers in a heterogeneous learning environment (IDEA, 2004). Schools' attempts to meet the NCLB mandates also changed the educational dynamic (Dee et al., 2010; NCLB, 2008; Robertson & Pfeiffer, 2016).

NCLB ushered in data-informed instructional practices to improve all students' educational opportunities (Dee et al., 2010). However, many fear the move may have led to a narrowed focus on students who scored just below the standardized test threshold score (Dee et

al., 2010). Although some utilized a narrowed approach to data-informed instruction, response to intervention (RtI) sought to use data to differentiate instruction to address students' academic needs across varying ability levels (Robertson & Pfeiffer, 2016). Tomlinson's (2014) model implements differentiated practices based on learner data collected throughout the unit. The data guides educators' modifications of the content, process, and product to effectively meet learners' needs. DI is not a novel approach to teaching but is an effective instructional strategy used to meet the diverse academic needs of a mixed-ability student population and gifted learners (Bernal, 2003; Gheyssens et al., 2020; SCDE, 2018). DI adapts the curriculum and instructional strategies to reflect students' readiness, interests, and learner profile (Tomlinson, 2014). In other words, teachers proactively plan lessons based on the learners' needs. While the move to learner-centered instruction represents a positive stance, many preservice and in-service teachers feel unprepared to meet diverse learners' academic needs (Clark, 2020; Johnsen & Kaul, 2019).

**Historical Context**

The underrepresentation in gifted education of Black and Hispanic learners and learners originating from under-resourced homes is not a new problem (Goings & Ford, 2018; Jenkins, 1939). In fact, 80 years of research exists on Black and Hispanic students' identification and participation in gifted programming. Recently, the focus expanded to include students originating from under-resourced homes (Goings & Ford, 2018). Surprisingly, given the history of the issue, there is limited research on the intersection of race, ethnicity, and poverty and gifted education. Jenkins (1939) identified the unfairness of assessments that assume all students have the same exposure to OTL. OTL include quality teachers, resources, and challenging curriculum (Olszewski-Kubilius & Corwith, 2018). Researchers echo Jenkins's (1939) sentiments today (Bottia et al., 2018; Ladson-Billings & Tate, 1995; Peters & Engerrand, 2016). Goings and Ford

(2018) asserted that a need exists to provide effective training to enable teachers to identify giftedness among underrepresented student populations such as those originating under-resourced homes, students of color, and students affected by the intersection of race, ethnicity, and poverty. The authors specifically noted the need to include suburban students in future studies.

The underrepresentation of students of color and students originating from under-resourced homes in gifted programming continues despite efforts to mediate the issue (Matthews & Rhodes, 2020; Peters et al., 2019). Gifted identification methods often overlooked students affected by the intersection of race, ethnicity, and poverty (Goings & Ford, 2018; McBee et al., 2016). Much of the research of the gifted identification of historically underrepresented student populations focused on the types of tests, their subsequent application, and the teacher as the gatekeeper (McBee et al., 2016; Peters & Engerrand, 2016). However, researchers asserted a need to shift or broaden the focus to include interventions, differentiation, and the provision of OTL (Matthews & Rhodes, 2020; Peters & Engerrand, 2016; Plucker & Peters, 2018).

The state of South Carolina sought to improve their gifted education programming and mediate underrepresentation of students affected by poverty and students of color (EIA, 1984; SCDE, 2017). The formation of the South Carolina Consortium for Gifted Education marked the beginning of the state's work toward recognizing and supporting gifted learners (SCDE, 2017). After the release of *A Nation at Risk* (United States Commission on Excellence in Education, 1983), the state legislature amended their Education Improvement Act (1984). The Education Improvement Act (EIA) recognized the need for improvement for all students, including students of color and students originating from under-resourced homes (EIA, 1984; SCDE, 2017). The

EIA (1984) also instituted mandates to guide districts' efforts to craft and implement gifted programming (SCDE, 2017).

**Societal Context**

South Carolina's State Department of Education (SCDE) permits districts to craft and implement gifted programming that aligns with National Association for Gifted Children (NAGC) and state standards (Corwith et al., 2019; SCDE, 2017). During the 1990s, South Carolina recognized the need to adapt the state's gifted identification procedures (SCDE, 2017). The SCDE implemented universal screening for all second-grade students to mediate the issue of underrepresentation. However, evidence indicated that universal screening might not mediate the problem due to inequitable access to quality OTL (Bottia et al., 2018; Ladson-Billings & Tate, 1995; Peters et al., 2019). As part of the program design, districts may choose to use regular classroom delivery of gifted services. The SCDE (2017) asserted that regular classroom teachers should implement differentiated practices and consider students' interests, readiness, and learning styles. Although South Carolina requires teachers of gifted children to differentiate their curriculum and instruction, gifted students spend a great deal of time in regular classrooms (NAGC, n.d.d, 2015; SCDE, 2018). South Carolina requires additional coursework to teach within the gifted program. However, the SCDE does not require regular classroom teachers to complete the coursework (SCDE, 2021b). Therefore, regular classroom delivery of gifted services may prove problematic due to teachers' low self-efficacy and inexperience with DI (Clark, 2020; Johnsen & Kaul, 2019).

Advanced learners require challenging OTL to exhibit their talents for gifted identification (Siegle et al., 2016). OTL included access to effective educators, resources, and academic support (Bottia et al., 2018; Ladson-Billings & Tate, 1995; Olszewski-Kubilius &

Corwith, 2018). Underrepresentation of students of color, English language learners (ELLs), and students originating from under-resourced homes in gifted education garnered the federal government's attention and subsequent funding in the 1980s (Plucker & Callahan, 2017). During this time, an expanded view of giftedness and intelligence developed (Gagné, 1985, 2005; Gardner, 1999; Plucker & Callahan, 2017; Renzulli, 2005; Sternberg, 1985, 1999b). The expanded view reflected the effect of the sociocultural nature of gifted identification and subsequent nurturing of giftedness to lead to a display of the talent (Plucker & Callahan, 2017).

**Theoretical Framework**

Differentiation also reflects the social aspect of learning. Vygotsky's (1978) sociocultural theory and Gardner's (1999, 2011) theory of multiple intelligences provide the underpinning for differentiated instructional practices (Tomlinson, 2014, 2017). Learners' interactions with adults or more knowledgeable peers foster learning (Vygotsky, 1978). Effective differentiation utilizes group learning based on learner profile data, including interests, readiness, and preferred method of learning, and adapts instruction to fit the group and lesson (Gardner, 1999, 2011; Tomlinson, 2017; van Geel et al., 2019). Unfortunately, teachers often oversimplify the concept of grouping and fail to adapt the lesson accordingly (Gheyssens et al., 2020). The learning environment is integral in fostering optimal community learning and requires a proactive approach (Tomlinson, 2017).

Bandura's self-efficacy theory guided the study (Bandura, 1977). Self-efficacy reflects confidence in the ability to accomplish something (Bandura, 1977). Self-efficacy is also vital to improving teachers' praxis (Suprayogi et al., 2017). Teachers' self-efficacy directly affected their ability to create engaging learning environments responsive to learners' academic needs (Reynolds et al., 2016). The ability to engage in experiences geared toward mastery improves

self-efficacy (Bandura, 1997). Unfortunately, many educators and preservice teachers do not feel efficacious about their ability to differentiate learning and may benefit from additional opportunities to engage in meaningful learning experiences (Clark, 2020; Dack, 2019a, 2019b; Reynolds et al., 2016; van Geel et al., 2019; Wan, 2016). Evidence suggests that many teachers enter the field with misconceptions about DI and feel ill-prepared to effectively meet diverse learners' needs (Dack, 2019a, 2019b; Wan, 2016). In addition, a disconnect exists between teachers', principals', and students' perceptions of what constitutes effective differentiation (Chandra Handa, 2019, 2020). The volume of teachers entering the field feeling unprepared to meet diverse learners' needs warrants an examination of in-service teachers' self-efficacy and DI implementation.

## Problem Statement

Students comprising today's classrooms originate from varied cultural, linguistic, ethnic, and socioeconomic backgrounds, with 15% of school-aged children living in poverty (NCES, 2019). Evidence indicated that poverty negatively affected academic performance, gifted identification (Olszewski-Kubilius & Corwith, 2018; Yaluma & Tyner, 2018), and exposure to quality OTL (Bottia et al., 2018; Ladson-Billings & Tate, 1995). While educators' influence on students' OTL experiences outside of school is negligible, providing quality OTL in school is in their purview. DI practices positively affected students' academic performance (Goddard et al., 2019; Prast et al., 2018; Puzio et al., 2020; Smale-Jacobse et al., 2019); however, many educators enter the field with misconceptions of DI and feel unprepared to implement DI practices (Dack, 2019a, 2019b; Wan, 2016). Although teachers of gifted students view differentiated practices as part of best practices in a more favorable light, they implement them in varying degrees (Johnsen & Kaul, 2019).

Gifted students receive most of their academic instruction in regular classrooms, underscoring the importance of implementing DI practices (NAGC, 2015). Reduced provision of gifted training for regular classroom teachers may represent a barrier to effectively meeting advanced students' needs in regular classrooms (Johnsen & Kaul, 2019; NAGC, 2015). Evidence indicated that training teachers to effectively meet gifted learners' academic needs positively influenced teaching skills, academic performance, and cultivated a positive classroom climate (Hansen & Feldhusen, 1994; Johnsen et al., 2002; Vreys et al., 2018). However, researchers identified variance among gifted trained educators' implementation of DI practices (Johnsen & Kaul, 2019; Miller, 2009).

The problem is that mixed-ability classrooms necessitate DI implementation, yet factors such as self-efficacy, teacher and principal perceptions, experience, educator grade level placement, and training may influence effective implementation (Bernal, 2003; Brigandi et al., 2019; Chandra Handa, 2019, 2020; Gheyssens et al., 2020; Suprayogi et al., 2017; Whitley et al., 2019; Wilson et al., 2018). Few studies addressed the variance of DI implementation between gifted trained teachers and teachers without gifted training. The current study seeks to address the gap in the literature examining teachers' sense of self-efficacy and their perspective and use of DI across a broader range of educators, specifically focusing on the variance occurring between gifted endorsed teachers and teachers without gifted endorsement (Brigandi et al., 2019; Johnsen & Kaul, 2019; Miller, 2009; Poulou et al., 2019; Wan, 2016).

## Purpose Statement

The purpose of this quantitative, predictive correlational study was to determine if a relationship exists between teachers' self-efficacy, their use of DI strategies in their practice, and gifted endorsement. The study focused on teachers in grades K4 through 12 in high-poverty

school districts in northwestern South Carolina. The special focus was on schools offering gifted programming and teachers with gifted endorsement.

The study used empirical data collected from surveys composed of Likert-type scales to assess teachers' self-efficacy and perceptions and frequent use of DI strategies in their practice, and teacher demographic data (gifted education endorsement, subject area taught, grade level taught) to examine the problem (Gall et al., 2007). The criterion variable teachers' self-efficacy is a teacher's belief in his or her ability to instruct others and bring about change through his or her efforts (Bandura, 1977, 1993). The second criterion variable was teachers' perceptions of differentiated instruction and the third criterion variable was the teachers' frequency of implementation of DI strategies. Differentiated instruction is a student-centered pedagogical approach to teaching which modifies the content, process, and product curriculum components and the environment to reflect students' interests, readiness, and profile (Tomlinson, 2017). The predictor variable was gifted endorsement (Warner, 2013). Gifted endorsement for the state of South Carolina requires the completion of six credit hours of approved graduate-level coursework at a participating university (SCDE, 2021b). Successful completion of the coursework leads to gifted endorsement noted on the educator's state licensure. The study sought to examine the possible predictive relationship between gifted endorsement, teachers' sense of self-efficacy, teachers' perceptions of differentiation, and the frequency of teachers' implementation of DI practices.

## Significance of the Study

The study added to the existing body of research on differentiated instructional strategies in teachers' praxis and teachers' self-efficacy. Many studies focused on DI, teacher self-efficacy, training to teach gifted learners, and gifted services (Gubbins et al., 2021; Hansen & Feldhusen,

1994; Johnsen et al., 2002; Ramli & Yusoff, 2020). However, some also noted the need to expand the current body of literature to include studies on DI and teachers' efficacy across subject areas to expand the teacher demographic and the need to advance the knowledge base of DI (Dixon et al., 2014; Poulou et al., 2019; Wan, 2016). The study helped bridge the gap between teachers' perceptions of DI, their use of DI, teachers' self-efficacy, and gifted training experience across grade levels and subject areas in schools offering gifted programming.

Although the study's population was K4 through grade 12 teachers in schools affected by poverty in northwestern South Carolina, the study has broader implications. The study added to the assertion that DI meets today's culturally and linguistically diverse (CLD) student population's academic needs (Tomlinson, 2017). The provision of quality OTL for CLD students affected by poverty aligns with the tenet of ZPD in Vygotsky's (1978) sociocultural theory, Gardner's (1999, 2011) multiple intelligences theory, and Gagné's (1985, 2005) gifted model. Gagné (1985) asserted that students exhibit giftedness by displaying talents. Students' exposure to OTL varies across socioeconomic status (Peters & Engerrand, 2016). Therefore, a differentiated learning environment may present an appropriately challenging learning environment for CLD students affected by poverty to exhibit evidence of giftedness. Although some may view DI as time prohibitive, its effective implementation positively affected academic performance (Goddard et al., 2019; Prast et al., 2018; Puzio et al., 2020; Smale-Jacobse et al., 2019).

The study also added to the growing body of literature addressing the need to improve TEPs (Dack, 2019a, 2019b; Darling-Hammond, 2006a; Reynolds et al., 2016; Santangelo & Tomlinson, 2012; Wan, 2016). The trepidation expressed by preservice teachers regarding their ability to effectively meet diverse learners' academic needs affects students and the teaching

profession. Within this context, educators overlooked gifted learners to help struggling learners (Johnsen & Kaul, 2019; Park & Datnow, 2017). A cohesive approach to effectively implemented DI may help meet today's diverse student population's academic needs (Tomlinson, 2017).

## Research Questions

**RQ1:** Can gifted endorsement predict the level of teachers' self-efficacy as measured by *Teachers' Sense of Efficacy Scale* among teachers in schools that offer gifted programming?

**RQ2**: Can gifted endorsement predict teachers' perspective of differentiated instructional practices as measured by *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?

**RQ3**: Can gifted endorsement predict teachers' frequency of implementation of differentiated instructional practices as measured by *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?

## Definitions

1. *Agency* – Agency is an individual's belief or feeling that he or she has control over their situation or environment (Bandura, 2012).
2. *Cognitive processes* – Cognitive processes are the functions individuals utilize to gain, store, understand, and apply knowledge (Bandura, 1993).
3. *Content* – Content is the material taught or information provided to students as part of the learning activity (Tomlinson, 2017).
4. *Culturally and linguistically diverse (CLD)* – Culturally and linguistically diverse students originate from diverse ethnic, language, and socioeconomic backgrounds (NAGC, n.d.c).

5. *Curriculum compacting* – Curriculum compacting is a facet of differentiation used with advanced and gifted learners. Teachers modify the content for students who demonstrate mastery and offer advanced learning opportunities or enrichment (NAGC, n.d.d).
6. *Differentiated instruction (DI)* – Differentiated instruction is a student-centered pedagogical approach to teaching in which the teacher modifies the content, process, and product to reflect students' interests, readiness, and profile (Tomlinson, 2017).
7. *Gifted and talented students* – Gifted students are advanced learners who exhibit the capability to perform at elevated levels in a specific domain represented by intellect, academics, creativity, art, or leadership (NAGC, n.d.c).
8. *Opportunities to learn (OTL)* – Opportunities to learn are formal and informal activities that present engaging and enriching educational learning activities. OTL encompass the provision of quality teachers, resources, and challenging curriculum (Olszewski-Kubilius & Corwith, 2018).
9. *Process* – The process is the path students take to achieve learning and conceptualize the idea or topic (Tomlinson, 2017).
10. *Product* – A product is evidence that learning took place. Students demonstrate learning through summative assessments that allow for student choice (Tomlinson, 2017).
11. *Teacher self-efficacy* – Teacher self-efficacy is the teacher's belief in his or her ability to instruct others and bring about change through their efforts (Bandura, 1977, 1993).
12. *Zone of proximal development (ZPD)* – The zone of proximal development describes the optimal area of learning where learners stretch just beyond what they can accomplish without assistance (Vygotsky, 1978).

# CHAPTER TWO: LITERATURE REVIEW

## Overview

This chapter provides an overview of the self-efficacy theory, the differentiated instruction model, and gifted education theories. The section also connects these theories and the model to the present research study. Next, a synthesis of current literature examining gifted programming, prior attempts to mediate the underrepresentation of students originating from under-resourced homes, and differentiated instruction is provided. Lastly, the chapter demonstrates the rationale for the current study. The limited current research examining the relationship between gifted training, teacher's self-efficacy, and DI implementation, the need to expand the literature to include additional grade levels and subject areas, and the conflicting evidence demonstrating varying degrees of implementation among gifted trained teachers is identified.

## Theoretical Framework

A theoretical framework guides and provides the perspective for a study (Grant & Osanloo, 2014). The theory also determines how the researcher viewed the phenomenon. This literature review examined the relationship between differentiated instruction (DI) and the provision of quality OTL and their relationship to gifted identification and the provision of gifted services to underrepresented gifted student populations. The review also examined teachers' preparedness to implement DI strategies into their praxis. Bandura's self-efficacy theory (Bandura, 1977, 1993) guided the examination of teachers' sense of self-efficacy in their ability to implement DI strategies into their practice (Tomlinson, 2014). Tomlinson's DI model, its supporting intelligence theories and learning theories, guided the study's examination of DI and

the provision of appropriately challenging OTL (Gardner, 1999, 2011; Sternberg, 1985, 1999a, 1999b; Tomlinson, 2014; Vygotsky, 1978).

The study included teachers' gifted endorsement status, gifted learners, and advanced learners, therefore Gagné's (1985, 2005) and Renzulli's (2005) gifted models guided the examination of gifted education. The models helped delineate the expectations of the program and tenets of identification. However, the South Carolina Department of Education references Gagné's (1985, 2005) Differentiated Model of Giftedness and Talented (DMGT) noting that in the "model, the gifts are "seeds" of excellence and achievement, as set of natural abilities that need to be fully developed" (SCDE, 2017, p. 5). Therefore, Gagné's (1985, 2005) DMGT was the main gifted model for the study. An examination of the intersection of poverty, race, and gifted identification and the provision of gifted services may reveal a relationship between teachers' use of differentiation and the disparity in the identification and participation rates of students of color and students originating from under-resourced homes.

**Self-Efficacy Theory**

Bandura's self-efficacy theory originated as a tenet of the social cognitive theory (Bandura, 2000, 2012). Bandura asserted that belief in one's abilities, or self-efficacy, influenced agency which affects actions taken to exert control over one's environment and future (Bandura, 2000). Agency describes an individual's perception of the amount of control he or she exerts over his or her environment. Agency and self-efficacy interact with the latter influencing individuals' sense of agency (Bandura, 2012). Bandura described the relationship among the components of the social cognitive theory as "triadic" (Bandura, 2012, p. 11). Bandura asserted that individuals' observable behaviors or actions stem from the interaction between three constructs—intrapersonal influences, activities individuals engage in, and their environment.

Self-efficacy comprises individuals' interpersonal influences; therefore, individuals' beliefs in their ability to enact change through their actions influence their immediate and future actions (Bandura, 2012; Tschannen-Moran & Hoy, 2007; Zee & Koomen, 2016). Self-efficacy is a significant factor in individuals' incentive to act and continue to act despite obstacles (Bandura, 2000; Tschannen-Moran & Hoy, 2007). Bandura further asserted that self-efficacy influenced individuals' actions, choices, and willingness to persevere when presented with challenges (Bandura, 2012).

### *Perceived Self-Efficacy in Cognitive Development and Functioning*

Perceived self-efficacy is an individual's belief that he or she can accomplish something (Bandura, 1977, 1993). The level of individuals' sense of self-efficacy directly affected perseverance; therefore, individuals with a low sense of self-efficacy often avoid challenging circumstances (Bandura, 1977, 1993). For example, teachers may avoid employing an effective instructional strategy if they doubt their ability to successfully implement the strategy or they experienced negative repercussions from previous attempts implementing the strategy (Tschannen-Moran & Hoy, 2007; Wilson et al., 2018; Zee & Koomen, 2016). Avoidance of failure leads individuals to refrain from engaging in activities connected to previous failed attempts (Bandura, 1993). Faced with continued failures, individuals' incentive to engage in challenging activities diminished. Providing individuals with opportunities to experience success increased their self-efficacy and resiliency (Bandura, 2012; Wilson et al., 2018).

Self-efficacy affects four areas—cognitive processes, motivational processes, affective processes, and selection processes (Bandura, 1993). The interconnectedness of the three levels of schools' self-efficacy—student, teacher, and collective faculty self-efficacy—influenced academic achievement. Although teachers' self-efficacy affected their ability to create engaging

and challenging learning environments (Künsting et al., 2016; Reynolds et al., 2016; Zee & Kooman, 2016), student characteristics, in connection with the collective self-efficacy of the school's faculty, exerted a greater influence on achievement than attempts to improve achievement performance directly (Bandura, 1993). Using path analysis, Bandura (1993) demonstrated that the connection between the student body characteristics (.27), prior achievement (.32), and faculty collective efficacy (.34), collectively (.93) exerted the greatest influence on academic achievement. In other words, the combination of student characteristics that influenced the faculty's belief in their ability to enact positive academic change fostered a possible greater gain in school achievement.

**Cognitive Processes.** Self-efficacy interacts with and influences individuals' cognitive processes (Bandura, 2012). Individuals' means of acquiring, storing, understanding, and using knowledge comprises their cognitive processes (Bandura, 1993, 2012). Individuals also process their future actions based on their past experiences (Bandura, 1977; Wilson et al., 2018). The learned, or cognized response, reflects individuals' belief in their ability to succeed in certain contexts (Bandura, 1977; Wilson et al., 2018). Continued failures and successes involving tasks viewed as easy or simple hindered self-efficacy development (Bandura, 1977, 1986). Appropriately challenging mastery learning opportunities seemed to improve individuals' sense of self-efficacy or belief in their abilities (Bandura,1977, 1986; Reynolds et al., 2016).

***Concept of Ability.*** Evidence indicated that self-efficacy affected individuals' utilization of their knowledge and skillset (Bandura, 1993; De Neve et al., 2015). De Neve et al. (2015) noted the direct influence of teachers' self-efficacy ($R^2$ = 21, factorial influence = .20 where $p <$ .01) on their willingness to implement DI strategies into their practice. Bandura (1993) further asserted that the greater the self-efficacy, the more determined the individual to accomplish the

task or the greater the resolve to persist. Self-efficacy influenced teachers' persistence in task implementation and longevity in the field (De Neve et al., 2015; Tschannen-Moran et al., 1998). Bandura delineated an individual's belief about ability according to the idea that ability is innate or an attainable skill (Bandura, 1993). The latter worked more diligently and for extended periods undeterred by missteps and failures. Mastery experiences provided individuals with appropriately challenging tasks to foster growth and perseverance (Bandura, 2012; Tschannen-Moran & Hoy, 2007). Tschannen-Moran and Hoy (2007) noted that mastery experience's contribution to teacher self-efficacy was significant (b = .26), with 19% of the variance in teachers' self-efficacy explained by mastery experiences. Therefore, the inference is that individuals' ability to experience failure and apply the lessons learned from the attempt influenced their self-efficacy (Bandura, 2012; Tschannen-Moran & Hoy, 2007).

***Social Comparison***. The contextual nature of comparison influenced the perceived level of self-efficacy (Bandura, 1993). In addition, individuals' perceived mastery of a concept or task also influenced self-efficacy (Bandura, 1977, 1993). Reynolds et al. (2016) observed positive growth in the self-efficacy of preservice teachers enrolled in a mastery experience-centered graduate program. Teachers engaged in clinical practice designed by the teacher education program to improve teacher self-efficacy. The researchers observed significant gains in several areas including in the preservice teachers' self-efficacy in engaging learners (pre-program $M$ = 3.1, a = .87, post-program $M$ = 3.5, a = .87, sig. 0.000) and classroom management (pre-program $M$ = 3.0, a = .73, post-program $M$ = 3.5, a = .71, sig. 0.001). Learning that focused on personal progress and gains instead of competitive group comparisons promoted a positive sense of self-efficacy (Bandura, 1993).

**Motivational Processes**. Motivation is the reason for attempting a task, whereas self-efficacy is the individual's belief in his or her ability to accomplish the task (Bandura, 1993). When individuals with a significant sense of self-efficacy fail to achieve a goal or complete a task, they believe they did not work hard enough (Bandura, 1993). Conversely, when people with an inadequate sense of self-efficacy experience the same scenario, they blame their ability level. Self-efficacy exerted influence on several areas related to motivation. Efficacious individuals set more challenging goals and worked more diligently for extended periods, even when challenged (Bandura, 1993, 2000, 2012). Thinking through the goal-setting process also affected motivation (Bandura, 1993). Bandura asserted that when efficacious individuals perceived goals as challenging, their motivation increased. A growth mindset also involves viewing challenges as attainable as a method of self-improvement (Dweck & Yeager, 2019). Rhew et al. (2018) noted significant gains in learners' motivation when teachers adopted a growth mindset or belief that all learners can learn. The growth mindset treatment group ($M$ = 159.13, $SD$ = 12.27) scored higher than the control group ($M$ = 141.64, $SC$ = 8.27) where $p < .001$, on the motivation instrument scores ($M$ = 17.48, at the 95% CI [12.51, 22.46], $t(65.93) = 7.02$, $p < .00$) in reading (Rhew et al., 2018, p. 12). Locke and Latham (2002) also supported Bandura's research and assertion with their goal setting theory. Locke and Latham noted that crafting challenging goals for individuals fostered the crafting of problem-solving strategies, which they also linked to highly efficacious individuals.

**Affective Processes**. Individuals who believe they possess the ability to exert control over a situation seem less reactive to stressful situations (Bandura, 1993, 2012). In other words, they employ coping skills instead of reacting to the stressors and perceiving them as threatening. Teachers who perceive themselves as ineffective in classroom management and instructional

ability often withdraw from colleagues (Bandura, 1993). In contrast, teachers' positive experiences with DI implementation increased self-efficacy and teachers' desire to implement new strategies (Bandura, 1993; Suprayogi et al., 2017)

**Selection Processes.** Self-efficacy influenced individuals' choices (Bandura, 1993). A strong sense of self-efficacy led individuals to an optimistic view and thoughtful consideration of multiple future options. Although some of their options included challenges, efficacious individuals viewed them as manageable and not as deterrents. In contrast, individuals avoid engaging in activities they feel exceeded their ability level (Bandura, 1993). Teachers cited their lack of knowledge among the barriers to their DI implementation (Whitley et al., 2019). Evidence indicated that knowledge and self-efficacy influenced teachers' choice to implement DI practices (Dixon et al., 2014; Whitley et al., 2019).

## Teachers' Self-Efficacy

Teacher's self-efficacy reflects a teacher's belief in his or her pedagogy to enact positive change in their students' academic growth (Bandura, 1993; Zee & Kooman, 2016). Teacher self-efficacy directly affected the environment through fostering engaging learning environments and the utilization of varied pedagogical approaches (Bandura, 1993; Reynolds et al., 2016; Wan, 2016; Yough, 2019). Teachers efficacious in their pedagogy created engaging environments promoting learning (Bandura, 1993; Reynolds et al., 2016; Yough, 2019). Teachers efficacious in their instructional methodology also positively affected learner development (Bandura, 1993; Wan, 2016; Zee & Kooman, 2016). "Teachers who believe strongly in their instructional efficacy support development of students' intrinsic interests and academic self-directedness" (Bandura, 1993, p. 140). Zee's and Kooman's (2016) review study revealed that efficacious teachers differentiate, attend to students' interests, and facilitate academic achievement. Research

indicated that training specific to meeting diverse learners' needs positively affected the preservice teachers' self-efficacy (Thomas & Mucherah, 2016; Wan, 2016; Yough, 2019). Wan (2016) examined the relationship between self-efficacy and DI implementation pre- and post-completion of a DI course for preservice teachers. Wan (2016) noted that the mean items' range increased across the personal teaching efficacy items (pre-test $M = 3.23$, $SD = .59$, post-test $M = .50$, $SD = .50$, +27.55 $M$ score increase). Teachers' expressed level of confidence that their TEP prepared them to teach effectively increased significantly (pre-test $M = 3.21$, post-test $M = 4.07$, and an increase of 26.79% in the mean score).

Highly efficacious teachers often wove mastery learning experiences into their curriculum and implemented DI or best practices (Bandura, 1977, 1993; Whitley et al., 2019). The practice of including mastery experiences exhibits components of Vygotsky's zone of proximal development, a component of Tomlinson's differentiated instruction model (Bandura, 1993; Tomlinson, 2014; Vygotsky, 1978). A positive learning atmosphere celebrates accomplishments and provides scaffolding to struggling students (Bandura, 1993; Tomlinson, 2014). The scaffolding provided support enabling students to engage in appropriately challenging OTL and communicated the teachers' positive belief that all learners can succeed (Tomlinson, 2014).

### *Collective School Efficacy*

Positive self-efficacy improved staff morale and the school environment (Bandura, 1993). Teachers' perceived collective self-efficacy vacillated across grade levels taught. Bandura examined teachers' collective sense of self-efficacy to catalyze positive change in math and reading where self-efficacy scores ranged from 0.0 -7.0. The study included teachers across grades K through six. Kindergarten teachers expressed a low sense of collective self-efficacy

(6.0 for reading, 5.7 for mathematics). However, the lower elementary grade teachers possessed a strong perceived collective self-efficacy with second-grade teachers expressing the strongest sense of self-efficacy (6.7 for reading, 6.8 for mathematics). Third-grade teachers perceived collective self-efficacy was significantly lower (6.3 for reading, 6.0 for mathematics) and sixth-grade teachers' self-efficacy was the lowest of all for mathematics (5.5). Bandura (1993) noted the troubling effect of weak collective self-efficacy on students' school transition and the overall school atmosphere.

Of interest to this study is the connection between poverty level and teacher's collective efficacy (Bandura, 1993). A weaker sense of self-efficacy pervaded schools with significant levels of poverty (Bandura, 1993). Goddard and Goddard (2001) noted that the school-level factor of the percentage of students originating from under-resourced homes negatively correlated with teachers' collective efficacy ($r$ = -.726, $p < 0.01$). Goddard et al. (2017) noted a similar negative correlation ($n$ = 47, $r$ = -.24) between teachers' collective efficacy and the number of students enrolled originating from under-resourced homes. The finding supported Ladson-Billings' and Tate's (1995) assertion that schools affected by the intersection of race, ethnicity, and poverty provide fewer quality OTL. However, when highly efficacious teachers in schools affected by the intersection of race, ethnicity, and poverty approached learning with the belief that all students can learn, or growth mindset, students performed at higher academic achievement levels (Bandura, 1993). A teacher with a growth mindset, or belief that all students can learn, believes that his or her efforts foster the growth of students' academic abilities (Dweck, 2006; Sousa & Tomlinson, 2018). The growth mindset reflects Bandura's (1993) assertion that belief in one's ability leads to action. Although Bandura asserted that teachers' belief that all students can learn improved academic performance, he did not provide supporting

data. Dweck and Yeager (2019) noted that the academic gains across several studies were minimal but most prominent among at-risk learners—first-generation students of color attending college and students attending low-performing schools. They further asserted that a greater gain might come from using a growth mindset to mediate existing inequalities in education among students of color and students attending low-achieving schools instead of other costly programs. However, studies indicated a positive correlation ($N$ = 168,533, $r$ = .34) between mindset and tests scores with a noticeable improvement among student populations originating from socioeconomically disadvantaged homes and who also adopt a growth mindset (Claro et al., 2016; Yeager & Dweck, 2020).

The desire to avoid failure may inhibit teachers' willingness to include new instructional strategies, subsequently affecting their praxis. Accounting for student interests and developing learner agency supports tenets of DI (Tomlinson, 2017). Considering learners' interests to guide curriculum modifications engages them in the learning process. Tomlinson noted that a learner-centric approach to teaching employs the teacher as a facilitator to guide students toward self-directed learning, independent thinking, and active engagement in directing their learning. Therefore, increasing teachers' sense of efficacy in instructional practices, such as differentiated learning, affects both the educator and the learner. Bandura (1997) asserted that self-efficacy affects individuals' utilization of the means at their disposal. In other words, simply possessing the ability to accomplish a task does not mean that the individual feels confident enough in their ability to enact change. Mastery learning experiences build self-efficacy (Bandura, 1977; Reynolds et al., 2016). Although some teacher education programs (TEPs) provided mastery learning experiences by applying theory to practice as part of a cohesive education program, many teachers enter the classroom with an inadequate sense of self-efficacy in their ability to

implement DI (Dack, 2019a. 2019b; Darling-Hammond, 2006a; Reynolds et al., 2016; Wan, 2017).

## Tomlinson's Differentiated Instruction Model

Tomlinson's DI model provides a comprehensive philosophical framework allowing teachers to implement DI strategies into their pedagogy (Tomlinson, 2017). The model involves modifying the content, process, product, and learning environment. The modifications reflect students' interests, readiness, preferred approach to learning, and learner profile. Tomlinson also asserted that teachers should embrace teaching up and adopt a growth mindset to successfully implement DI practices (Tomlinson, 2017). Learning theories and intelligence theories support the key tenets of Tomlinson's model.

### *Theoretical Underpinnings of Tomlinson's Differentiated Instruction Model*

Several theories provide the theoretical underpinning of Tomlinson's comprehensive model of DI (Tomlinson, 2017). Vygotsky's zone of proximal development (ZPD) supports the idea of providing appropriately challenging OTL based on leaners' readiness (Tomlinson, 2017; Vygotsky, 1978). The DI tenet asserting the need to differentiate according to learner profile reflects learners' intelligence preferences, cultural influences, and preferred learning style preferences (Tomlinson, 2017). Gardner theorized that individuals possess strengths reflecting their preferred intelligence (Gardner, 1999, 2011; Tomlinson, 2017). Sternberg also asserted that a single factor does not effectively measure intelligence and noted the contextual nature of intelligence (Sternberg, 1985, 1999b; Sternberg & Grigorenko, 2002). Tomlinson's (2017) comprehensive model of DI encompasses the tenets of the intelligence theories, environmental and cultural influence exerted on intelligence, and the optimal learning zone.

**Zone of Proximal Development.** Vygotsky's ZPD infuses learning with development (Vygotsky, 1978). According to Vygotsky, ZPD is the distance between what individuals are capable of accomplishing with assistance from adults or peers and what they are capable of accomplishing alone. Learners' ZPD provides educators with valuable insight to guide curriculum planning and learning opportunities that coincide with maturation and academic development (Vygotsky, 1978). Vygotsky's ZPD supports DI practices. Vygotsky indicated the social nature of development and learning through interaction with more advanced peers. DI utilizes grouping based on learners' interests, abilities, and methods of learning (Tomlinson, 2017). Pairing learners with more knowledgeable peers expanded their ZPD (Vygotsky, 1978).

Tomlinson's DI model also notes the importance of teachers' belief that students' academic abilities are not fixed and respond to effective instructional practices (Tomlinson, 2014). Teachers' philosophical belief in a growth mindset, or belief that all learners can learn, is an essential component of the three pillars of effective differentiation (Dweck, 2006; Tomlinson, 2014). Learners' abilities are not fixed; therefore, the difficulty of the OTL presented to students must increase as their ability or readiness level increases to foster academic growth (Dweck, 2006; Sousa & Tomlinson, 2018; Vygotsky, 1978). Continued failure associated with OTL too difficult for learner mastery erodes learners' confidence and zeal for learning (Tomlinson, 2014). Also, learners continually presented with material considered too easy may lose their enthusiasm for learning. Continued failure also connects to Bandura's (1977) assertion that learning opportunities providing mastery experiences improved self-efficacy. Teachers, therefore, should assess the learners' readiness level and present material just above the ZPD to foster growth (Vygotsky, 1978).

**Theories of Intelligence**. Intelligence and its value vary across cultures. Despite this variance, researchers attempted to define and measure intelligence. Spearman (1904) quantified the measure of intelligence and called it *g*, or general intelligence. Spearman viewed intelligence as a single factor that affected other actions. The controversial idea of only one form of intelligence led other theorists to examine the nature of intelligence and the ability to assess it. Sternberg and Gardner expanded the concept of intelligence to include several areas such as practical, analytical, and spatial intelligence (Gardner, 1999, 2011; Sternberg, 1985, 1999a). Sternberg's work at Yale University and Gardner's work at Harvard led to intelligence theories most closely related to gifted education and Tomlinson's concept of learner profile (Gardner, 1999, 2011; Sternberg, 1985, 1999a; Tomlinson, 2014).

***The Theory of Successful Intelligence and The Triarchic Theory of Human Intelligence.*** Sternberg's triarchic theory of human intelligence provided an expanded view of Spearman's *g* (Spearman, 1904; Sternberg, 1985, 1999a). Sternberg later expanded upon the theory and included it as a sub-theory in the theory of successful intelligence, which also serves as a model for gifted education (Sternberg, 1999b; Sternberg & Grigorenko, 2002). Sternberg posited that intelligence varies across people and cultures and comprises three types of intelligence—practical, creative, and analytical (Sternberg, 1985). Individuals display practical intelligence by successfully reacting and adapting to their environment. Individuals exhibit creative intelligence by applying their knowledge to solve novel problems. The third intelligence, analytical, refers to knowledge traditionally measured by intelligence quotient (IQ) tests. Mental processes common to all individuals serve as the basis for all intelligence (Sternberg & Grigorenko, 2002). The processes vary across cultures in the way individuals use them. Metacomponents evaluate and plan, performance components act on the plans of the

metacomponents, and knowledge-acquisition components acquire knowledge for problem-solving. Sternberg posited that understanding intelligence requires viewing it in the context of the interaction between individuals' external world, internal world, and their experiences (Sternberg, 1999a). The internal or mental processes are universal, but the external world differs by individual and culture. Individuals use their experience and knowledge to respond to their environment. The utilization of these processes to adapt to the external world represents intelligence and varies according to the cultures' environment and expectations. In other words, intelligence is not simply the possession of knowledge; it is also the use of the knowledge that displays intelligence.

> If one views intelligence at least in part in terms of adaptive behavior in the real-world environment … it is impossible fully to understand the nature of intelligence without understanding how this environment shapes and is shaped by what constitutes intelligent behavior in a given sociocultural context (Sternberg, 1985, p.44).

SES also affects how intelligence is defined (Sternberg, 1999b). Individuals not only adapt to fit their environment; they also adapt their environment to fit their needs. However, opportunities to adapt the environment vary according to SES. In other words, individuals originating from under-resourced homes possess fewer opportunities to adapt their environment. Within the context of the environment, Sternberg also stated that race and literacy factor into the adaptability of the environment (Sternberg, 1999b).

***Theory of Multiple Intelligences.*** Gardner also expanded the idea of intelligence to include seven and later nine intelligences (Gardner, 1999, 2011). Gardner's definition of intelligence is similar to Sternberg's in that intelligence is universal and culturally grounded (Gardner, 2008; Sternberg, 1985, 1999a). Intelligence involves problem-solving or creating

something culturally significant or valued (Gardner, 2008). Gardner's nine human intelligences are spatial intelligence, linguistic intelligence, musical intelligence, bodily-kinesthetic intelligence, logical-mathematical intelligence, interpersonal intelligence, intrapersonal intelligence, naturalist intelligence, and existential intelligence (Gardner, 1999, 2008, 2011). Two intelligences, logical-mathematical and linguistic, reflect intelligence traditionally valued in academics (Gardner, 2008). Musical, bodily-kinesthetic, and spatial intelligences reflect skills valued in the arts. Interpersonal and intrapersonal intelligences reflect individuals' ability to understand others and self-awareness. The naturalist intelligence refers to individuals engaged in and sensitive to their environment, note environmental changes, and apply knowledge learned from their environment. The last intelligence, existential intelligence, refers to individuals' ability to see the world from a holistic standpoint (Gardner, 2008). The existentialists seek to understand the purpose and meaning of humankind. Gardner noted three truths about intelligence: intelligence is universal, intelligence is unique to each individual, and intelligence does not automatically equate to acting intelligently (Gardner, 2008). The existence of multiple intelligences denotes the need to address students' strengths in the classroom by differentiating the learning experiences (Gardner, 2008). However, Gardner noted the impracticality of assessing each intelligence psychometrically. The intricate nature of the intelligences involves observation and performance (Gardner, 2008). Gardner and Sternberg recognized the importance of experience in shaping intelligence (Gardner, 2008; Sternberg, 1999a). Sternberg and Gardner also noted the importance of considering cultural relevance to the value placed on gifts and talents (Gardner, 2008; Sternberg, 1999a).

Gardner (2011) noted three variables associated with learning—the medium, the location, and the agent disseminating the knowledge. Learning institutions directly affected these three

variables during the formative years (Gardner, 1999). The learning environment, the curriculum, and the teacher affected learning (Gardner, 1999; Tomlinson, 2014). Tomlinson's DI model addresses each of the three components adapting the content, process, product, and environment in response to learners' varying academic needs and interests (Sousa & Tomlinson, 2018; Tomlinson, 2014). Understanding how students learn provided information to guide a differentiated approach to the pursuit of learning (Gardner, 1999; Sousa & Tomlinson, 2018; Tomlinson, 2017).

***Differentiated Learning in Theory.***

Tomlinson described DI as a philosophical approach to teaching and learning based on the idea that education can expand all learners' potential (Tomlinson, 2014, 2017). DI espouses the tenet that students use different methods and strategies to learn (Tomlinson, 2014). Teachers implementing DI adapt curriculum and instruction to meet all learners' academic needs (Tomlinson, 2014, 2017; Tomlinson et al., 2003; Tomlinson & McTighe, 2006). Allowing for learners' differences requires differentiating the three main curriculum components of content, process, and product and proactively responding to students' readiness, interests, and learner profile (Dack, 2019a; Tomlinson, 2014, 2017; Tomlinson et al., 2003). Figure 1 describes the interaction of the key elements of Tomlinson's DI model (Tomlinson, 2014; Tomlinson & Moon, 2013).

**Figure 1**

*Differentiated Instruction's Key Elements*

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*Note*: Key components of DI using Tomlinson's model. Reprinted from *The Differentiated Classroom: Responding to the Needs of All Learners, 2nd Ed.* (page 425), by C. A. Tomlinson, ASCD. Copyright 2014 by ASCD. Reprinted with permission. (See Appendix F).

**Curriculum Components**. The curriculum components work in concert to help students understand each unit's or lesson's goals—what teachers want the students to know, understand, and do (KUD) at the end of the unit (Tomlinson, 2014; Tomlinson & Moon, 2013). Differentiating the content, process, and product according to learners' interest, readiness, and profile guides learners toward a deeper understanding of the content, allowing them to experience effortful learning (Tomlinson, 2014; Tomlinson & Moon, 2013). The curriculum components in a differentiated classroom delineate the lesson's goals and present a unified approach to what the students learned, how they learned it, and how they displayed their understanding (Tomlinson, 2014).

***Content***. The content component includes the ideas and concepts teachers choose as student learning goals or objectives (Tomlinson, 2014). Content also includes the materials used to attain the knowledge (Tomlinson, 2014). In other words, content is the "what" students learn, and the materials and sources used to learn it (Bondie et al., 2019; Tomlinson, 2014). Both the objectives and materials may vary according to learners' readiness, interests, and preferences (Tomlinson, 2017).

***Process***. The process component includes the activities, or OTL, through which students work towards understanding the content (Tomlinson, 2014). The OTL matched students' ability,

or readiness, and challenged them just beyond their comfort area (Tomlinson, 2014). The OTL challenged the students to extend their understanding using activities that require effort and include support from a knowledgeable peer or adult (Tomlinson, 2014; Vygotsky, 1978). The OTL also included opportunities for students to apply their knowledge to extend their understanding of the concept (Tomlinson, 2014).

***Product.*** Differentiation employs ongoing formative assessments to guide the instruction and allow students to demonstrate their conceptual thinking (Tomlinson, 2014). The product represents the culminating summative assessment. The product component provides students with the opportunity to exhibit or display their understanding of the concept (Bondie et al., 2019; Tomlinson, 2014; Tomlinson & Moon, 2013). The product varies from the traditional use of paper-and-pencil end-of-unit assessments and offers students choices (Tomlinson & Moon, 2013). The product directly aligns with the KUDs of the lesson or unit, and students demonstrate their understanding of the concept through application, not repetition (Tomlinson, 2014).

**The Learner.** DI is learner-centric, not teacher-centric (Tomlinson, 2014). The teacher facilitates the learning and employs ongoing assessments and learner data to design instructional components and OTL that meet learners' needs. Teachers that implement DI strategies as part of their praxis also adopt a growth mindset and understand that learners' grow and change in response to the learning (Dweck, 2006; Tomlinson, 2014). Therefore, differentiated lessons are fluid, adjusting to learners' changing readiness, interests, and profiles (Tomlinson, 2014).

***Readiness***. Learner readiness is learners' current level of understanding, or prior knowledge, of a topic or concept and reflects their current ability level (Tomlinson, 2014). Differentiating content, process, and product according to learner readiness also relies on their ZPD (Tomlinson et al., 2003; Vygotsky, 1978). Educators seek to expand learners' ZPD by

challenging them with tasks just beyond what they can accomplish without assistance (Tomlinson et al., 2003; Vygotsky, 1978). The tasks, or OTL, include scaffolding based on the learners' ability level (Tomlinson & Moon, 2013). Teachers ascertain learner readiness through pre-assessments based on the KUDs of the lesson (Tomlinson, 2014). Tomlinson (2014) noted the interdependent nature of instruction and assessments based on learner readiness. DI relies on the ongoing data collection process to plan and modify lessons that reflect learners' readiness. Teachers assess learners' readiness for a concept using formal and informal means (Tomlinson, 2014; Tomlinson & Moon, 2013).

***Interests***. Adapting curriculum and instruction to include learners' interests improved motivation and engaged learners in the educational process (Tomlinson et al., 2003). Differentiation engages learners by crafting a supportive learning environment, allowing them to choose topics of interest and selecting among summative assessment projects (Tomlinson, 2014, 2017; Tomlinson et al., 2003). Engaged learners could become more agentic and self-directed (Bandura, 1993; Tomlinson et al., 2003). Educators employ multiple approaches and use varying instructional strategies to reach learners based on learners' interests, ability levels, and profiles (Tomlinson, 2014, 2017).

***Profile***. The profile component reflects the understanding that learners make sense, or gain understanding, of knowledge in different ways (Tomlinson, 2014). Learners' preferred methods of working through and understanding a concept vary (Gardner, 1999, 2011; Tomlinson, 2014). Learners' profiles include preferred strategies and learning methods influenced by their preferred intelligences, learning styles, gender, and cultures (Gardner, 1999, 2011; Tomlinson, 2014; Tomlinson & McTighe, 2006). Several factors, including the environment, learner intelligences, and learner culture, affect how students learn, process

information, and display their giftedness (Gardner, 1999, 2011; Sternberg, 1985, 1999a; Tomlinson, 2014). DI involves crafting lessons and OTLs that include a variety of methods, or paths, to arrive at a deeper level of understanding (Tomlinson, 2014).

The methods and strategies learners use to achieve understanding include effortful learning (Brown et al., 2014). Learners are often challenged to identify effective learning strategies and mistakenly narrow their scope to one or two preferred methods of learning. Individuals learn in various ways (Tomlinson, 2014). Individuals may possess multiple intelligences that affect how they learn or acquire knowledge (Brown et al., 2014; Gardner, 1999).

DI is not static; it changes and adapts to learners' evolving needs (Tomlinson, 2017). Educators use assessments as diagnostic tools to identify strengths and weaknesses to craft appropriately challenging OTL (Tomlinson, 2014). DI empowers educators to proactively meet learners' needs interconnecting professional expertise with differentiation pedagogy (Tomlinson, 2017). DI aids in bridging the gap between learner and learning (Tomlinson, 2017). "...we cannot reach the mind we do not engage…" (Tomlinson, 2017, p. 15). In other words, effectively implemented DI engages educators and learners in the learning process.

**Gifted Education Models**

Understanding a phenomenon begins with the ability to define it. The National Association for Gifted Children (NAGC, 2019) defines giftedness in the context of ability and best practices. According to the NAGC (2019), gifted or talented students "…perform—or have the capability to perform—at higher levels compared to others of the same age, experience, and environment in one or more domains" (p. 1). Students from all race/ethnic groups and SES can possess gifts or talents. However, the definition of giftedness related to identification varies

across states (NAGC, 2015). Various models and theories guide the identification process (Gagné 1985, 2005; Renzulli, 2005). Renzulli's (2005) and Gagné's (1985, 2005) models reflect the cultural context of the NAGC's (2019) assertion that giftedness transcends culture and SES.

### *Three-Ring Conception of Giftedness*

Renzulli (2005) viewed giftedness in the context of an individuals' culture. The three-ring conception of giftedness centers around three domains—well above average ability, creativity, and task commitment. The intersection of the three rings or domains tends to define or identify giftedness. Well above-average ability is comprised of two types of abilities. General ability refers to general intelligence, and specific abilities refer to the ability to acquire and apply knowledge. Identifying many of the abilities mentioned above requires trained educators or observers and not traditional assessments (Renzulli, 2005). Schools serving students originating from socioeconomically disadvantaged homes with limited resources may not possess sufficient resources to adequately train teachers to identify the domains. Renzulli (2005) noted that research indicated that the use of tests and arbitrary cutoffs tend to be exclusionary (Card & Giuliano, 2016; Carman et al., 2018). The model's remaining two rings focus on nontraditional ideas of giftedness (Renzulli, 2005).

Renzulli (2005) posited that individuals who exhibit giftedness exemplify the remaining two rings—task performance and creativity. Gifted individuals persevere through challenging tasks and are intrinsically motivated. Gifted individuals also display creativity by exhibiting original thought by solving novel problems (Renzulli, 2005; Sternberg, 1999a). Unfortunately,

traditional tests and identification procedures fail to identify traits associated with task performance and creativity (Renzulli, 2005).

Renzulli (2005) asserted that a major problem exists in identification processes/methods. Other researchers shared Renzulli's concerns noting the use of teacher nominations (Machts et al., 2016; McBee et al., 2016) and IQ tests (Fernández et al., 2017) as ineffective means of gifted identification. Many processes/methods consist of a narrow scope and define giftedness by focusing on one form of assessment (Renzulli, 2005). The narrow scope excludes many qualified individuals (Renzulli, 2005).

Researchers suggested the employment of both performance and non-performance assessments to overcome the exclusionary practice (Acar et al., 2016). Because of the environments' significant effect on intelligence, the use of traditional IQ tests may not serve as a true assessment of the ability of students of color or children originating from socioeconomically disadvantaged homes. Poverty negatively affected learners' academic achievement and access to quality OTL which also affected their gifted identification (Hamilton et al., 2018; Olszewski-Kubilius & Corwith, 2018; Peters & Engerrand, 2016). A majority of schools identify gifted learners before they enter the third grade (Ricciardi et al., 2020). Although early identification is advantageous to early access to gifted programming (Hodges et al., 2018; Matthews & Rhodes, 2020; VanTassel-Baska, 2018), unequal access to OTL and the use of tests to identify giftedness may reduce the likelihood of students originating from under-resourced homes being identified as gifted (Hamilton et al., 2018).

### *The Differentiated Model of Giftedness and Talents.*

Gagné's (1985) DMGT attempted to delineate how giftedness is defined and displayed. Gagné identified four areas of aptitude among gifted individuals: intellectual, creative, socio-

emotional, and sensorimotor. Engaging in learning activities allows individuals to display their giftedness through performance or talents (Gagné, 2005). The DMGT denoted four types of learning and practicing—natural progression or maturation, informal learning which occurs contextually in day-to-day experiences, self-taught formal learning, and formal institutionally-driven learning which includes instruction. The four forms of learning and practice provide opportunities for gifted learners to hone and display their talents in specific areas (Gagné, 2005).

Gagné (1985) viewed giftedness and talents as a dichotomy comprised of competence and performance representing the possession and display of the capability of aptitude. The constructs of giftedness and talents share commonalities but represent two different domains where individuals may possess the ability or aptitude, but might not display it (Gagné, 2005). Above-average competence defines giftedness while above-average performance defines talent (Gagné, 1985). Therefore, underachievers may be gifted, but they do not display their ability through a noticeable talent in a specific area.

In light of the controversy of Spearman's *g*, Gagné did not clearly define domains of intelligence (Gagné, 1985; Spearman, 1904). Other theorists, such as Gardner and Sternberg, expanded the domain of intelligence to include multiple areas of intelligence (Gardner, 1999, 2011; Sternberg, 1985, 1999a). The DMGT theory expands Renzulli's three-ring conception of giftedness to address the issue of gifted underachievers and the narrow scope of the display of talent and creativity (Gagné, 1985; Renzulli, 2005). The concepts of giftedness and talent occupy two different areas (Gagné, 1985). Gagné theorized that individuals could be gifted but not talented, but they cannot be talented and not gifted, which explains underachievement in gifted individuals. Talents and gifts are affected by external factors or catalysts (Gagné, 1985).

The catalysts identified by Gagné (1985) included the individuals' personality, interests, motivation, and environment. The environment affects individuals more than their giftedness. The home environment and learning environment represent areas often identified as affecting cognitive ability, but Gagné also includes the identification model as a factor. Gubbins et al. (2021) also expressed a concern that gifted identification methods may not align with the services intended to support gifted learners in fostering and displaying their giftedness. The nature of identified gifts and talents and the interaction with the catalysts to produce identifiable proof of their existence needs support in a differentiated environment (Gagné, 1985). However, variance occurs in learners' exposure to OTL, especially those originating from under-resourced homes (Olszewksi & Corwith, 2018). The varied exposure to appropriately challenging OTL may inhibit learners' opportunities to exhibit their giftedness. Tomlinson's (2014) model may provide the appropriately challenging OTL needed to allow gifted students the opportunity to display their giftedness. Gagné (1985) further asserted that gifted learners require a differentiated learning environment. Tomlinson's (2014) model incorporates learners' interests, preferred intelligence and learning modality, to create an engaging, differentiated learning environment.

**Theory, Models, and Research Connection**

For this study, one theory, the self-efficacy theory, served as a guide to examine the relationship between DI implementation and training among teachers in schools offering gifted programming. Although the study did not seek to extend the self-efficacy theory, evidence indicated a positive relationship between self-efficacy and teachers' instructional practices such as DI implementation (Reynolds et al., 2016; Suprayogi et al., 2017; Wan, 2020). Suprayogi et al. (2017) noted a significant correlation between teachers' sense of self-efficacy and their implementation of DI practices ($B = .73$, $SE\ B = .05$, and $\beta = .54$, where $p < .05$, and $R^2 = 0.39$).

Reynolds et al. (2016) linked improved self-efficacy in helping students effectively interact with new knowledge (pre-program $M = 3.1$, post-program $M = 3.6$, pre-program $\alpha = .72$, post-program $\alpha = 86$, *sig* .000) and deepen their understanding of new knowledge (pre-program $M = 2.9$, post-program $M = 3.7$, pre-program $\alpha = .79$, post-program $\alpha = 84$, sig .000) to effective training. However, evidence also indicated that teachers, including gifted trained teachers, implemented DI in varying degrees (Dack & Triplett, 2020; Johnsen & Kaul, 2019; Wan, 2017). DI incorporates OTL based on learner's ZPD to foster academic growth (Tomlinson, 2014; Vygotsky, 1978). Gifted identification relies on learners' ability to demonstrate their advanced academic ability; however, equitable access to OTL varies for many students of color and students originating from socioeconomically disadvantaged homes (Acar et al., 2016; Bottia et al., 2018; McBee et al., 2016; Olszewski-Kubilius & Corwith, 2018; Peters & Engerrand, 2016). In addition, gifted learners receive most of their academic instruction in a regular mixed-ability classroom (Gubbins et al., 2021; Johnsen et al., 2020; NAGC, n.d.b). Therefore, the inconsistency with which teachers seem to implement DI in contemporary diverse mixed-ability classrooms highlights the need to examine the relationship in greater depth through the self-efficacy lens.

## Related Literature

Opposition to the idea that a single factor cannot define intelligence led Sternberg, Gagné, and Renzulli to identify culturally responsive methods of identifying intelligence and giftedness (Gagné 1985; Renzulli, 2005; Sternberg, 1985, 1999a, 1999b; Sternberg & Grigorenko, 2002). Sternberg's culturally contextualized definition of intelligence led to years of research to apply the theory of successful intelligence and identify appropriate means of assessing it (Sternberg 1985, 1999a, 1999b; Sternberg & Grigorenko, 2002). Sternberg, Gagné,

and Renzulli argued the need to adapt the identification process to reflect the expanded view of intelligence (Gagné, 1985; Renzulli, 2005; Sternberg, 1985, 1999a, 1999b; Sternberg & Grigorenko, 2002). Research studies supported the assertion that many of the tests used to assess giftedness are ineffective unless used in combination with other assessments or utilized in a different manner (Acar et al., 2016; Carman et al., 2018; Fernández et al., 2017; Lakin, 2018; Sternberg, 2018). Other researchers indicated a need to implement intervention to accommodate for inequitable access to quality OTL (Olszewski-Kubilius et al., 2017).

The effect of poverty and race/ethnicity on academic achievement is well documented. Research studies indicated a large disparity in the identification rates of students of color (Grissom & Redding, 2016; Hodges et al., 2018; Lamb et al., 2019). Research also indicated high disparity rates of identification for students originating from under-resourced homes (Hamilton et al., 2018; Olszewski-Kubilius & Corwith, 2018). The documented negative effects of the intersection of race/ethnicity and poverty on academic achievement warrants further examination because of the potential influence on the identification of students of color and students originating from under-resourced homes as gifted.

Gifted students originate from all ethnic and socioeconomic backgrounds (NAGC, 2019). Varying degrees of exposure to quality OTL may impede their academic development and hence affect the likelihood of gifted identification (Bottia et al., 2018; Ladson-Billings & Tate, 1995). Teachers who adopt DI practices as part of his or her pedagogy craft OTL based on learners' ZPD and readiness (Tomlinson, 2017; Vygotsky, 1978). However, teachers often do not implement DI with fidelity and cited several impediments to DI implementation (Bondie et al., 2019; Wan, 2017; Whitley et al., 2019). Factors such as ineffective TEPs, insufficient resources, time, and support affected teachers' sense of self-efficacy in implementing DI practices and the

fidelity of the implementation (De Neve et al., 2015; Reynolds et al., 2016; Wan, 2017; Whitley et al., 2019). The connection between self-efficacy and DI implementation warrants additional study because of the possible effects of their relationship on gifted identification.

## Gifted Education

The National Association for Gifted Children (NAGC) defined giftedness as learners' ability to perform at advanced academic levels as compared to their peers (NAGC, 2019). The NAGC also noted the contextual nature of giftedness by including academic experience and the environment as part of the comparison to identify giftedness. Giftedness transcends race, socioeconomic status, and cultures. Gifted learners display their advanced ability through talents (Gagné, 1985). Advanced learners' exposure to appropriately challenging OTL allows them opportunities to hone and display their gifts and talents (Olszewski-Kubilius et al., 2017; NAGC, 2019).

### *Benefits of Participation*

The advantages of participation in gifted programs extend beyond the K-12 classroom. Graefe and Ritchotte (2019) examined the predictors of success for gifted Hispanic students ($N$ = 257) taking Advanced Placement (AP) exams (College Board, 2020) compared to their non-identified Hispanic peers. The researchers selected the sample from a high-poverty and culturally diverse high school. The predictor variables included SES status, ELL status, gifted status, grade point average, gender, and prior AP success (College Board, 2020; Graefe & Ritchotte, 2019). Gifted status proved to be the only variable significantly correlated with success on AP (College Board, 2020) exams, $X^2(1, n - 309) = 9.8$, $p = .002$, $\Phi = .05$ (Graefe & Ritchotte, 2019). Graefe and Ritchotte (2019) noted that Hispanic students' success outside the classroom might serve as a protective factor. Bolland et al. (2018) also identified giftedness as a possible protective factor.

Bolland et al. examined the role of gifted identification in reducing risky behaviors in students of color originating from under-resourced homes ($N$ = 7,957). The majority of the target population (over 95%) identified as Black. The results varied across age groups but proved most effective with adolescent males (Bolland et al., 2018). The positive influence of gifted education goes beyond the classroom and may serve as a protective factor for students of color and students originating from under-resourced homes (Bolland et al., 2018; Graefe & Ritchotte, 2019).

### *Negative Effects of Poverty on Gifted Students*

Poverty affects a large percentage of children across the United States (NCCP, 2018). Insufficient resources and equitable access to challenging learning opportunities affects advanced learners' academic performance and may impede their opportunity to participate in gifted programming (Cross et al., 2018; Hamilton et al., 2018; Plucker & Peters, 2018; Siegle et al., 2016). Although the NAGC (2019, 2020) asserts the need for and supports the provision of quality gifted programming for all gifted learners, advanced learners encounter obstacles in their academic pursuits (Cross et al., 2018; Siegle et al., 2016).

**Defining Poverty.** The National Center for Children in Poverty (NCCP, 2018) reported that in 2016, poverty affected 41% of children in the United States, with nearly seven million living in deep poverty. The national measure of poverty is an income of $23,550.00 or less annually (NCCP, 2018). However, NCCP (2018) noted that this figure is calculated using a methodology created more than 50 years ago. The use of the outdated method to calculate the poverty threshold indicates that the number of children living in poverty could actually be higher. A more accurate representation would be to state that a family of four needs about twice the amount of income used to measure poverty, or $47,100.00, to live comfortably (NCCP,

2018). The enormity of the poverty's effect is evident when reports indicated that half of the public-school children in the United States meet the requirement to receive free or reduced lunches (Plucker & Peters, 2018). Although poverty's effects extend across the United States, a higher percentage of those living in poverty reside in the South (NCCP, 2018).

**Poverty's Effects on Academic Achievement.** With such a high number of children living in poverty, the question becomes, "How does the social construct of poverty affect educational development?" The documented effects of poverty on gifted students' academic performance range from underrepresentation in gifted programming to academic barriers within the school (Cross et al., 2018; Hamilton et al., 2018; Plucker & Peters, 2018; Siegle et al., 2016). These effects are worth noting because students have cited specific barriers such as a lack of resources, a lack of academically challenging OTL, as well as exposure to school violence as reasons for their underachievement (Cross et al., 2018). A critical assessment of the provision of challenging OTL could indicate a need to assess the gifted program's effectiveness and fit of the learner within the program.

The identified barriers to academic achievement existed on multiple levels—student, school, and district—indicating a systemic issue (Hamilton et al., 2018). In addition, high-ability learners' competency affected their opportunity to engage in challenging academic settings (Cross et al., 2018). Learners cited boredom and learning activities below their competence level as evidence of inappropriately challenging OTL. Affording students the opportunity to successfully engage in appropriately challenging academic programs with differentiated curriculum should be the standard for gifted programs. Gagné (1985) asserted that gifted learners not afforded to opportunity to hone their giftedness in a supportive and challenging learning environment may lose their gifted standing. According to Siegle et al. (2016), gifted students in

rural communities faced additional barriers, including low teacher expectations and reduced access to an appropriately challenging learning environment. Low teacher expectations not only affected students' academic achievement and self-efficacy, but it could also produce a longitudinal effect affecting their future success and income potential (Crabtree et al., 2019; Siegle et al., 2016).

### *Gifted Student Identification and Services*

Gagné (1985) asserted that gifted learners exhibit advanced ability through talents and need opportunities to display their academic ability. Due to the absence of federal mandates, gifted identification procedures and programming services vary across states (NAGC, 2020). Poverty's effects on academic growth and access to quality OTL presented additional challenges to gifted learners originating from under-resourced homes (Hamiliton et al., 2018; Siegle et al., 2016). Identification procedures often include IQ or aptitude tests and do not factor in the variance of learners' access to OTL (Peters & Engerrand, 2016).

**Definition of Gifted Learner.** The NAGC's (2019) definition of giftedness reflects a broad and inclusive approach to defining giftedness. Giftedness transcends cultures and socioeconomic status and includes learners who may require additional support services. Gifted learners possess the ability to perform beyond their grade level or the performance level of their peers and thus require appropriately challenging OTL to hone and display their ability or talent (Gagné, 2005; NAGC, 2019). Giftedness also occurs in more than one domain (NAGC, 2019). Although most states included intellectual and academic areas of giftedness in their definition, a limited number of states broadened their view to include students across socioeconomic, cultural, and twice-exceptional student populations (NAGC, 2015). Of the 37 responding states with a state-adopted definition of giftedness, only one included a definition of a profoundly gifted

learner. The NAGC (2015) noted that 37 of the 39 states included in their report utilized a state-adopted definition of giftedness. While the number of states adopting definitions of giftedness recently increased to 44 (NAGC, 2020), the focus remained on academic and intellectual ability, with less than one-half of the responding states including visual arts, leadership, and music as domains in their definition.

Hodges et al. (2018) examined states' gifted definitions and identification procedures and noted that the definition of giftedness adopted by states affected states' assessment of giftedness and guided the identification process. The narrow view of giftedness stemming solely from cognitive ability adopted by some states may lead to the implementation of exclusionary practices that focus exclusively on test performance. The narrow of view of giftedness contradicts the assertions of Sternberg, Gagné, and Renzulli that a single factor fails to identify intelligence and that culturally responsive gifted identification methods require a broader view (Gagné, 1985; Renzulli, 2005; Sternberg, 1985, 1999a, 1999b; Sternberg & Grigorenko, 2002).

The No Child Left Behind Act (2008) crafted a federal definition of giftedness but did not enact mandates governing gifted programming and identification (Siegle et al., 2016). The NCLB Act (2008) allows states to adopt their own definition of giftedness (NAGC, 2015). Hamilton et al. (2018) perceived the inconsistency of defining what constitutes giftedness as a barrier to their research and limited their ability to compare learner data between states. Improved clarity could help remove the obstacles that impede identifying and providing services for gifted students from historically underserved populations (Siegle et al., 2016). In addition, utilizing standardized testing procedures and clearly defined standards could aid in a more equitable representation among high-achieving students from socioeconomically disadvantaged homes.

**Barriers to Gifted Learner Identification.** The ambiguous definition of what constitutes giftedness is even further exacerbated by poverty's adverse effects, possibly making it more difficult for teachers to identify gifted learners in poverty-stricken communities and schools. School-aged children as young as six faced barriers and adverse effects attributed to the effects of poverty (Siegle et al., 2016). Siegle et al. (2016) attributed poverty's negative effect to a lack of quality programs designed to promote cognitive development. The poverty level of the school serving these students is also a factor in effectively identifying giftedness (Hamilton et al., 2018). Hamilton et al. (2018) found that school poverty is a strong predictor of the number of students identified as gifted. School poverty, when combined with student poverty, led to an even less likely chance of gifted identification (Hamilton et al., 2018). In a tri-state study, a negative correlation ($r$ = -.65, $r$ = -.31, and $r$ = -.42) existed between the number of students who qualified for the free or reduced lunch program and the percentage of identified gifted students. In State 1, students who did not qualify for the free or reduced lunch program were five times more likely to qualify for gifted programming than their peers from under-resourced homes. These findings illuminated the inequitable funding issues that could be plaguing some schools leading to the barriers students identified as impeding their success. Hamilton et al. (2018) found that even when students from socioeconomically disadvantaged homes scored as high as their peers on academic assessments, their chances of identification remained low in State 1($\Upsilon_{100}$ = -.61). Therefore, gifted learners originating from under-resourced homes and attending high-poverty schools may not realize their academic potential.

The reality that underrepresented populations from culturally diverse under-resourced areas also may not reach their full academic potential without academic intervention clarifies the negative effect of poverty (Crabtree et al., 2019; Siegle et al., 2016). Research indicated a

connection between students from under-resourced homes, race, and academic achievement. Kaya et al. (2016) noticed the significant relationship between verbal scores and verbal intelligence and qualifying for free or reduced lunch programs. Students who qualified for the programs scored lower on verbal intelligence [$F(1, 119) = 11.\ 43$, $p < .05$, $\eta^2 = .09$, power .918)] than students who did not qualify for lunch subsidies (Kaya et al., 2016, p. 92). The connection also diminished their chances of being identified as gifted (Crabtree et al., 2019; Kaya et al., 2016). The negative academic performance associated with the intersection of poverty and race is pivotal as low SES predicted low verbal scores, which led to students from socioeconomically disadvantaged homes not being identified as gifted because some programs rely solely on IQ verbal scores (Kaya et al., 2016). This underrepresentation led to additional academic barriers manifested in enrollment disparities in advanced placement (AP) courses in secondary education (Crabtree et al., 2019). Crabtree et al. (2019) observed a negative relationship between students' SES and their access to AP courses ($r = -.61$). The greater the number of students originating from under-resourced homes, the lower the number of AP courses offered. These findings were troubling as students' chances for admission to post-secondary schools depend on high school academic performance. Even more alarming is the apparent perpetuation of poverty's negative effect as a quality education could help students overcome poverty's generational effects. However, intervention providing quality OTL showed promising results.

**Intervention.** Efforts to mediate poverty's effects on gifted learners through curricular modifications or interventions proved promising (Olszewski-Kubilius et al., 2017; Van Tassel-Baska, 2018). Callahan et al. (2017) noted that nearly half of the schools in their study utilized measures to foster talent development among their historically underrepresented student populations. Olszewski-Kubilius et al. (2017) used a front-loading intervention program to

reduce the achievement gap for high-achieving students of color affected by poverty. Project Excite identified high-achieving students of color originating from socioeconomically disadvantaged homes and provided OTL from third grade through eighth grade. The project dropped the teacher nomination precursor in favor of allowing all students of color an opportunity to apply for admission to Project Excite. The OTL consisted of special courses focusing on STEM, weekend enrichment programs, and laboratory experience (Olszewski-Kubilius et al., 2017). The students who completed the program consistently out-performed performed their peers. Students enter the program in 3rd grade and demonstrated progressive academic growth. Project Excite students' composite math score in 8th grade indicated significantly higher scores than students of color not enrolled in Project Excite (Black $M = 14.7$, $g = 1.36$, at the 95% *CI* [0.83, 1.87] and Latino $M = 15.2$, $g = 1.15$, at the 95% *CI* [0.61, 1.70]) (Olszewski-Kubilius et al., 2017, p. 30). The students also scored well enough to enroll in advanced courses during secondary school. The mathematics performance and placement for all of the Project Excite cohorts ($N = 149$) in 9th grade indicated strong academic growth where 76% scored above grade level, two enrolled in Algebra II, and 11 enrolled in Algebra II honors. In comparison to the high school student body members not in Project Excite where 72% scored above grade level and one enrolled in Algebra II, and 18 in Algebra II honors.

**Poverty and Gifted Identification**

The societal construct of poverty affected a large portion of students in the United States (NCCP, 2018; Plucker & Peters, 2018). Poverty negatively affected students' academic achievement across all levels of education (Olszewski-Kubilius & Corwith, 2018). Olszewski-Kubilius and Corwith (2018) conducted a literature review to examine poverty's effect on academic achievement. A small percentage of students originating from under-resourced homes

enter school performing at a high level of academic achievement (28%), and less than one-half of them remain at the top achievement level upon entry into the 5th grade. In contrast, 69% of high-performing students originating from well-resourced homes remain at the top level of academic performance. A limited number of students from under-resourced homes take an AP exam (28%) during their educational careers. Students originating from socioeconomically disadvantaged homes have access to fewer OTL and limited access to resources such as computers (Cross et al., 2018; Olszewski-Kubilius & Corwith, 2018). Olszewski-Kubilius and Corwith (2018) noted that research indicated that a limited number of middle schools with an elevated enrollment of students originating from under-resourced homes offered tracked courses for advanced learners. In addition, the researchers asserted that almost 50% of the disparity experienced in access to OTL might stem from school-level factors such as varied levels of curriculum and instruction quality and access to advanced courses. The effects of poverty on academic achievement also affected gifted identification (Callahan et al., 2017; Crabtee et al., 2919; Olszewski-Kubilius & Corwith, 2018).

### *Barriers and Relationships to the Identification Process*

Olszewski-Kubilius and Corwith (2018) conducted a literature review to examine the academic achievement and subsequent gifted identification of students originating from socioeconomically disadvantaged homes. Olszewski-Kubilius and Corwith noted several contributing factors to academic achievement. Three main categories emerged: reliance on tests and mandated state cutoff scores, teacher referrals, and disparity in OTL availability. OTL encompassed learners' access to resources such as computers, books, challenging courses, and qualified educators (Bottia, 2018; Olszewski-Kubilius & Corwith, 2018). The researchers

asserted that poverty's negative effect is most prominent in learners' access to OTL (Olszewski-Kubilius & Corwith, 2018).

**Opportunities to Learn and Resources.** OTL offered students the chance to enrich their learning experiences (Bottia et al., 2018; Olszewski-Kubilis et al., 2017). Several elements comprised OTL. Access to quality teachers, resources, and appropriately challenging curriculum comprises quality OTL (Olszewski-Kubilius & Corwith, 2018). Students from socioeconomically disadvantaged homes were less likely to have the opportunity to take advanced classes (Olszewski-Kubilius & Corwith, 2018). In addition to missed educational opportunities, schools with a large percentage of students from socioeconomically disadvantaged homes employed less qualified teachers (Fischer et al., 2020; Hamilton et al., 2018; Olszewski-Kubilius & Corwith, 2018). Fisher et al. (2020) noted that among teachers employed at schools serving a high percentage of learners originating from socioeconomically disadvantaged homes, teachers in schools receiving the least funding had less experience and were considered less knowledgeable in their respective fields ($M$ = -0.462, $SD$ = 0.819) than their peers at schools receiving more per-student funding ($M$ = -0.90, $SC$ = 0/848) where $p < .01$ on the Whitney-Mann U tests correction (pp. 1299-1230). In addition, students attending schools receiving less funding had fewer instructional school days and scored lower on their AP exams. The researchers asserted that increased funding significantly influenced their test performance ($b$ = 0.023, $t(615) = 3.29$, $p < .01$). The findings may indicate that the lack of resources and instructional days equate to lost OTL through reduced resources and instructional time. Cross et al. (2018) also noted the relationship between poverty and reduced OTL.

Cross et al. (2018) used focus groups to compare how students originating from socioeconomically disadvantaged homes ($N$ = 45) and students originating from

socioeconomically advantaged homes ($N = 36$) homes viewed their educational opportunities. Using focus groups and interviews, Cross et al. examined the perceived barriers to learning for the groups. The majority of the students from socioeconomically disadvantaged homes attended a school with a high poverty rate. Although both groups noted variations of barriers, a sharp contrast existed in the availability of resources to support learning. Students originating from under-resourced homes mentioned a lack of laboratory equipment and computer access (Cross et al., 2018). Bottia et al. (2018) also cited a lack of computer access for students of color. School expectations between the two groups also led to missed OTL (Cross et al., 2018). Students from socioeconomically disadvantaged homes who performed well academically received rewards such as pizza parties. However, the students originating from socioeconomically advantaged homes who performed well received enrichment opportunities like academic competitions. The loss of OTL also extended to students' homes. One student reported not having access to the internet to complete assignments requiring internet access. The loss of OTL also affected gifted identification rates (Hamilton et al., 2018).

**Academic Achievement and Identification.** Hamilton et al. (2018) examined the effect of poverty on gifted identification at the individual and institutional levels. The study compared three different states and included students in grades three, four, and five ($N = 330,531$). Hamilton et al. (2018) found that individual poverty negatively affected the identification rates of low-income students. The results also showed that the identification rates of students from socioeconomically disadvantaged homes were lower than their peers originating from socioeconomically advantaged homes. Across the three states, students from socioeconomically disadvantaged homes' likelihood of being identified as gifted was between two and four times lower than that of their peers (Hamilton et al., 2018). Although Hamilton et al. controlled for

students' prior achievement on math and reading, schools still identified students originating from socially advantaged homes as gifted at a higher percentage rate (1.1% - 3.3%) than students originating from socioeconomically disadvantaged homes. Hamilton et al. (2018) controlled for prior math and reading scores to address the argument that students from socioeconomically disadvantaged homes may perform poorly on standardized tests. The gifted identification rate had a negative relationship with the level of school poverty.

The intersection of school poverty and school academic achievement also affected gifted identification rates (Hamilton et al., 2018). Even when students exhibited high academic achievement levels, the schools failed to identify them as gifted across all three states in the study ($\Upsilon_{100}$ = - .61, $\Upsilon_{100}$ = -.30, $\Upsilon_{100}$ = -.24). The percentage of students from socioeconomically disadvantaged homes negatively affected both the gifted identification rates ($r$ = -.064, $r$ = -.031, $r$ = -0.56) and math and reading achievement. Hamilton et al. (2018) identified a negative correlation between students' academic achievement in math ($r$ = -0.73, $r$ = -0.77, and $r$ = -0.47) and reading ($r$ = -0.80, $r$ = -0.82, $r$ = -0.67) and the level of school poverty across all three states. Kaya et al.'s (2016) findings also supported the negative effect of poverty on reading achievement. Kaya et al. (2016, p. 92) noted that even among gifted learners, reading scores for students from socioeconomically disadvantaged homes were significantly lower than students from socioeconomically advantaged homes ($F(1, 119) = 2.85$, $p < .05$, $\eta^2 = .10$, power = .945). The effect of poverty on gifted identification represents a national problem, with students originating from under-resourced homes identified at half the rate of students originating from well-resourced homes (Yaluma & Tyner, 2018).

***Underrepresentation***

Yaluma and Tyner (2018) used data from three national databases to describe the state of gifted education, poverty, and race. Of the total number of middle and elementary schools in the study ($N$ = 59,215), more than 25% were high-poverty schools. Although race and poverty level did not seem to affect the accessibility of gifted programming, participation rates varied according to race and poverty. Students in high-poverty schools participated in gifted programs at half the rate of students in low-poverty schools (Yaluma & Tyner, 2018). The disproportionate participation rate of White and Asian students in middle-poverty and high-poverty schools demonstrated the effect of poverty on students of color. White and Asian students represented 20.2% of the school population but made up 31.5% of the gifted population in high-poverty schools (Yaluma & Tyner, 2018). Olszewski-Kubilius and Corwith (2018) and Hamilton et al. (2018) also noted the disparity in the identification and participation rates of students from socioeconomically disadvantaged homes.

The intersection of individual and institutional poverty meant that poor students in a high-poverty school were less likely to be identified as gifted (Hamilton et al., 2018). The research pointed to multiple factors that contributed to the underrepresentation of students from socioeconomically disadvantaged homes (Olszewski-Kubilius & Corwith, 2018). Students from socioeconomically disadvantaged homes' access to OTL is more limited, affecting academic performance, which subsequently affected identification. The cyclical negative effect of poverty seemed to place an excessive burden on students from socioeconomically disadvantaged homes educational opportunities.

**Gifted Identification Models and Methods**

Two models, Renzulli and Gagné, explained the interconnectedness of gifts, talents, and culture (Gagné, 1985, 2005; Renzulli, 2005). Both identified the need to contextualize giftedness

with culture. The National Association of Gifted Children (NAGC, 2019) also noted the need to contextualize identification. Students' culture, SES, and access to OTL provide critical information to better understand students (NAGC, 2019). However, current tests do not reflect the models' premise of cultural relevance and the idea of multiple intelligences (Fernández et al., 2017; Sternberg, 1999a, 2018).

### *Methods, Practices, and Strategies of Gifted Identification*

Underrepresentation in gifted programming, a long-debated educational topic, continues to plague gifted education (Peters & Engerrand, 2016). Two schools of thought emerged from attempts to address the inequity. Some researchers contend that the current identification methods are biased and fail to consider cultural differences (Goings & Ford, 2018; McBee et al., 2016; Peters & Engerrand, 2016; Renzulli, 2005). The second assertion is that identification procedures should use test data differently (Carman et al., 2018; Goings & Ford, 2018; Peters & Engerrand, 2016). Evidence indicated that the current gifted identification methods/practices are inadequate (Goings & Ford, 2018; McBee et al., 2016). Current gifted identification methods/practices proved ineffective at identifying students of color from socioeconomically disadvantaged homes (Goings & Ford, 2018). The identification practices employed covered a wide range and included teacher nomination/checklist (Acar et al., 2016), nomination phase (McBee et al., 2016; Rothenbusch et al., 2016), and tests (Fernández et al., 2017). However, promising alternatives emerged, such as test adaptation (Lakin, 2018), nonverbal assessments, lower thresholds, and culturally responsive assessments (Goings & Ford, 2018).

**Performance Versus Nonperformance Identification Methods.** Gifted identification procedures vary across states but share some commonalities (NAGC, 2015). Schools used performance or nonperformance methods to identify gifted students (Acar et al., 2016). The

National Association of Gifted Children (NAGC, 2015) reported that of the 33 responding states with identification methods, 21 states required teacher and parent involvement in the process, and 12 states used nominations and referrals as nonperformance methods. Acar et al. (2016) conducted a meta-analytic review of the consistency with which variations of the two methods identified students as gifted.

Nonperformance methods of identification proved ineffective when they preceded the performance methods (Acar et al., 2016). If a nomination served as the gateway to testing, the process was ineffective. However, it is interesting to note that the inclusion of one form of teacher evaluation was successful. Acar et al. (2016) indicated that using a teacher rating scale with a performance method provided the highest consistency in gifted identification. The rating scale provided a checklist to guide the identification (Acar et al., 2016; McBee et al., 2016). Although Acar et al. (2016) found the rating scale effective when combined with a test, McBee et al. (2016) did not reach the same conclusion.

A psychometric analysis revealed that although the nomination phase identified some students as gifted, it failed to identify a much higher percentage of eligible students (McBee et al., 2016). The false-negative rate, or the rate at which the process failed to identify gifted students, may exceed 60%. For example, McBee et al. (2016) used the reported correlation coefficient for the gifted nomination instrument, Scales for Identifying Gifted Students General Intellectual Ability subscale (SIGS) and the CogAT ($r = .48$) to assess gifted identification methods (Riverside Insights, 2020; Ryser & McConnell, 2004). The researchers sought to examine the reliability and effectiveness of the various gifted identification methods utilized (McBee et al., 2016). If the CogAT (Riverside Insights, 2020) threshold score of 90$^{th}$ percentile is used and all students tested, the test identified 84% of gifted students (McBee et al., 2016).

However, the use of a screener or nomination phase reduced the identification percentage to 28% (McBee et al., 2016). Teachers' judgments were more accurate for intelligence and cognitive abilities than assessing and identifying giftedness (Machts et al., 2016). Practices such as tracking and homogeneous grouping decreased teachers' judgment accuracy (Machts et al., 2016). Teachers exhibited a lower ability to identify giftedness among students of similar high-ability levels ($Zr = 0.29$; $r = 0.28$, $p < 0.001$). Teachers also exhibited a lower ability to identify giftedness contextually to their class composition ($Zr = 0.54$, $r = 0.49$, $p < 0.001$). Evidence indicated that class composition and intelligence level affected gifted services and negatively affected gifted nomination (Machts et al., 2016; Rothenbusch et al., 2016). Researchers noted the need to exert caution when gifted identification employs the teacher as the gatekeeper to identification (Machts et al., 2016; Rothenbusch et al., 2016).

Rothenbusch et al. (2016) examined teachers' ($N = 105$) and students' ($N = 1,468$) data to determine if their characteristics affected the nomination phase. The data included items such as teachers' beliefs about intelligence, experience with gifted education, and students' intelligence, gender, and SES. The findings revealed that teachers' experience with gifted education and the intelligence level of the class negatively affected the likelihood of being identified as gifted. The higher the experience and intelligence, the lower the likelihood of identified. However, it is interesting to note that off-the-job teacher training was significant ($b = -0.43$, OR = 0.65, $p < .05$). Off-the-job teacher training increased the likelihood of students' nomination. Finally, Rothenbusch et al. (2016) noted variance, indicating that teachers used additional information or data to make the identification decision.

**Tests and Assessments.** Fernández et al. (2017) used Renzulli's (2005) three-ring model to examine the similarities of IQ test results when used to assess giftedness. Fernández et al.

(2017) used three tests to assess Spanish elementary students' IQ and noted low congruence among the tests. Thirty-one students from the sample scored equal to or above 130 when Fernández et al. viewed the tests' results separately. However, when Fernández et al. viewed the three tests together, only two tests converged to identify three students. Combining the three IQ tests failed to identify a student as gifted (Fernández et al., 2017). Hodges et al. (2018) examined the results of IQ and standardized tests in conjunction with nontraditional assessments.

Hodges et al. (2018) found somewhat different results. Hodges et al. (2018) conducted a meta-analysis of the practices used to identify students as gifted and talented. Districts often use the Naglieri Nonverbal Abilities Test (NNAT) or the Raven Standard Progressive Matrices (RAVEN) as an alternate method of identifying giftedness (Hodges et al., 2018; Naglieri & Ford, 2003; Raven, 2000). The tests reduce cultural and language bias to mediate underrepresentation (Hodges et al., 2018). The Cognitive Abilities Test (CogAT) combines verbal and nonverbal assessments to identify giftedness (Hodges et al., 2018; Riverside Insights, 2020). The Iowa Test of Basic Skills (ITBS) and IQ tests are examples of traditional assessments used with nontraditional methods (Hodges et al., 2018; The University of Iowa, 2020). Hodges et al. (2018) found no significant difference between nonverbal and verbal methods of identification in successfully identifying underrepresented students of color. The ANOVA results indicated that underrepresented student populations had a reduced chance of gifted identification, $Q(2) = 3.63$, $p = .16$. Carman et al. (2018) noted the need to analyze CogAT (Riverside Insights, 2020) test data differently, such as varying the norms or applying OTL qualifiers to address inequitable representation. Lakin (2018) explored a similar use of CogAT (Riverside Insights, 2020) test results using the Boolean rules AND, OR, and AVERAGE.

Lakin (2018) applied three Boolean rules to the CogAT results and identified a diverse population normally missed with standard identification methods (Riverside Insights, 2020). Lakin used the AND rule which combined all three batteries of the CogAT at the 90th percentile, the OR rule requiring a 90th percentile score on any of the three batteries, and the AVERAGE rule requiring that all three battery scores average to the 90th percentile (Lakin, 2018; Riverside Insights, 2020). The most relaxed rule, the OR rule, identified the most diverse population, AND = 6%, OR = 86%, and AVG = 34% (Lakin, 2018). Cross tabular results indicated that the AND and the OR rules resulted in similar identification results as per the number identified, 2,845 and 2,424, respectively at $p < .05$. Interestingly the three rules identified similar students in the demographic areas of gender and language (Lakin, 2018).

## Gifted Programming

The NAGC (n.d.d, 2020) promotes the implementation of differentiated curriculum to meet gifted learners' needs. The provision of gifted services varies across states with less than 50% of the states enacting legislation or implementing mandates governing gifted programming (NAGC, 2015, 2020). Although the NAGC (2015, 2020) supports the use of differentiation, only 15 states in 2020 and 12 in 2015 required differentiation as part of gifted programming. States reported barriers to service delivery and implemented varied models of gifted programming (NAGC, 2015, 2020). States implement gifted services and programs to varying degrees with gifted learners often receiving the majority of the academic instruction in a regular classroom setting (NAGC, 2015).

**State Mandates, Policies, and Practices.** The NAGC (2015) conducted a survey to report the state of gifted education programs in the United States. The survey collected data on policies, mandates, and other information related to the gifted programs. Forty-one states and the

District of Columbia responded and provided data on their gifted programs (NAGC, 2015). The lack of federal oversight led to a wide range of gifted services, practices, and mandates across the 42 respondents. Thirty-two states reported using mandates, and over half of the states included gifted education policies with their special education program. The identification policies also varied. Of the 33 states with identification criteria, 19 used multiple criteria such as teacher nominations, IQ tests, and portfolios (NAGC, 2015). Local education agencies controlled the gifted programs for 19 of the 33 states with mandates, and the states did not scrutinize their control and implementation of the mandates (NAGC, 2015). Hodges et al. (2018) indicated in their meta-analysis that researchers credited the gifted identification variance within districts to local decision-making policies. However, Peters et al. (2019) found that state mandates either did not affect the identification rate of underrepresented groups or negatively affected their identification rate.

Peters et al. (2019) examined the demographic composition of gifted education across the United States. More than 40% of schools in the United States did not identify any students as gifted for two years. The findings also found that state mandates did not affect the disproportionate rates of identification. The identification rates of the five racial/ethnic groups in the study were not affected by state mandates. Students identified as English language learners (ELL) or twice-exceptional had better representation without state mandates (Peters et al., 2019).

### *Gifted Services Delivery*

The majority of gifted programs used cluster grouping to deliver gifted services (Johnsen et al., 2020; NAGC, n.d.b). Budgetary constraints catalyzed the move to cluster grouping (Johnsen et al., 2020). Although some schools use the pull-out or self-contained delivery, gifted students spend most of their day in a regular classroom setting (Gubbins et al., 2021; Johnsen et

al., 2020; NAGC, n.d.b). "Effective clustering therefore requires differentiating instructional practices for gifted students within the classroom" (Johnsen et al., 2020, p. 206). Johnsen et al. (2020) noted that the majority of gifted-trained teachers in a cluster setting used a variety of instructional strategies and created a positive learning environment. The teachers also used data-informed instruction practices. However, very few (two literacy and zero in mathematics) teachers accounted for student interests and agency by allowing students to choose among content choices, processes, and products (Johnsen et al., 2020).

Although DI implemented with fidelity meets diverse learners' needs, a gap exists between theory and practice in implementation, often leaving gifted learners overlooked in favor of providing help to struggling learners (Vreys et al., 2018; Plucker & Callahan, 2017). The delivery of gifted programming in the regular classroom setting concerns researchers in the gifted education field (Plucker & Callahan, 2017). Although some saw improvements by providing DI training and gifted training, the training reached a limited number of teachers and often did not result in effective implementation (Brigandi et al., 2019; Vreys et al., 2018).

### *Barriers Experienced in Gifted Services Delivery*

Gifted programming implementation faced several challenges. Teachers' views of giftedness and gifted education often impeded effective delivery (Brigandi et al., 2019; Cross et al., 2018; Plucker & Callahan, 2017). Struggling learners were the priority for some teachers (Cross et al., 2018; Plucker & Callahan, 2017). Although training seemed a logical approach to correcting misconceptions of giftedness, researchers noted conflicting results (Hansen & Feldhusen, 1994; Miller, 2009; Vreys et al., 2018). Lastly, some gifted programming did not reflect the identification methods employed, thereby indicating a lack of cohesion in the gifted program (Gubbins et al., 2021).

***Teachers' beliefs***. Within the context of regular classroom delivery, teachers' views of gifted students affected the delivery (Plucker & Callahan, 2017). Teachers viewed the need to meet struggling students' needs as a greater priority because advanced learners' academic capability negates the need for differentiation (Cross et al., 2018; Plucker & Callahan, 2017). Teachers' views of gifted education mirrored that of traditionally structured classrooms (Brigandi et al., 2019). Brigandi et al. (2019) examined the effectiveness of gifted training using Renzulli's (1976) Enrichment Triad Model. Although the teacher's understanding of gifted learners and effective instructional strategies increased, their belief in how they should approach gifted education remained unchanged.

Although many viewed gifted training as a positive move toward meeting gifted learners' needs and enhancing instructional practices (Hansen & Feldhusen, 1994; NAGC, n.d.a; Vreys et al., 2018), Miller (2009) provided conflicting evidence. Varying levels of gifted training did not alter regular classroom teachers' beliefs about giftedness leaving many teachers holding on to the traditional view of giftedness (Miller 2009). Miller posited that the lack of change might reflect teachers' reluctance to change their beliefs. The finding is problematic as teachers often serve as the gatekeepers to gifted identification (NAGC, 2015; Olszewski-Kubilius et al., 2017).

***Program Disconnect***. The majority of states (NAGC, 2020) and each state's districts (Gubbins et al., 2021) reported using differentiation as part of gifted programming delivery. However, Gubbins et al. (2021) identified a disconnect between identification and programming (Gubbins et al., 2021). The results indicated that districts embrace the push-in delivery model delivery (Gubbins et al., 2021). However, the push-in model creates problems for gifted delivery. Although districts recognized learners' gifted identification, they did not provide a curriculum nor examine the delivery within cluster grouping (Gubbins et al., 2021). Callahan et al. (2017)

found that 43% of responding schools used cluster grouping or differentiation within the mixed-ability classrooms gifted services delivery. In addition, Callahan et al. (2017) asserted that school districts' gifted program goals often lacked clarity, with many schools (approximately 25% of the elementary and 33% of the middle schools) indicating that their districts did not provide curriculum resources specific to the gifted program.

## Differentiation

Some gifted advocates question the ability of DI to effectively challenge gifted and advanced learners in the regular classroom setting (Plucker & Callaham, 2017). However, the National Association of Gifted Children supports DI practices as effective means of meeting the needs of gifted and advanced learners (NAGC, n.d.c). Although researchers provided different definitions of DI, the main tenet of adjusting instruction to meet students' needs remained constant (van Geel et al., 2019). Differentiation in practice presented challenges to preservice and in-service educators (Boelens et al., 2018; Dack, 2019b; De Neve et al., 2015),

### *Differentiated Instruction in Practice.*

Meeting the diverse needs of contemporary learners challenges teachers' pedagogical approaches (Tomlinson, 2014). In the United States, 40% of children under 18 reside in socioeconomically disadvantaged households, with students of color comprising a disproportionate number of this population (NCCP, 2018; NCES, 2019). According to the NCES (2019), 24% of Black and 24% of Hispanic children live in poverty as compared to 8% of White children. Classroom diversity encompasses ability level, ethnicity and culture, gender, SES status, and interests (Tomlinson, 2017; Tomlinson et al., 2003). Learners' readiness, interests, and profiles drive differentiation (Tomlinson, 2017). The multifaceted nature of DI led to misconceptions and a lack of fidelity in implementation (Dack, 2019b; Tomlinson 2017).

Beginning teachers and in-service teachers experienced challenges in their attempts to successfully implement DI practices (De Neve et al., 2015; Tomlinson & McTighe, 2006). Using a path analysis ($\chi^2 = 8.618$, $df = 4$, $p = .07$, $CFI = .98$), De Neve et al. (2015) noted a direct connection between autonomy (.22, $p < .001$), self-efficacy (.20, $p < 01$, $R^2 = .21$), and self-reported DI in beginning teachers. The more autonomous teachers expressed higher self-efficacy and subsequently reported increased occurrences of DI implementation (DeNeve et al., 2015). Withal, issues with implementing DI extended beyond beginning teachers (Boelens et al., 2018).

**Perceived Barriers to DI implementation**. Teachers noted several perceived barriers to effectively implementing DI practices—control or agency, instructional strategy knowledge, dispositions, institution, class size and diversity, time, and resources (Bondie et al., 2019; Dack & Triplett, 2020; Wan, 2017; Whitley et al., 2019). In view of Bandura's (1993) assertion that teachers' agency and knowledge affect self-efficacy, the identified DI implementation barriers may consequently reduce their willingness to engage in activities in which they feel they may not succeed. Finally, teachers' mindset and beliefs about advanced learners also influenced DI implementation (Dijkstra et al., 2017; Johnsen et al., 2020; Tomlinson, 2014).

**Clear Definition of Differentiation**. Researchers cited a need to clarify the ambiguous definition and surface-level understanding of what constitutes DI which some teachers oversimplified as simple grouping (Bondie, 2019; Bondi et al., 2019; Gheyssens et al., 2020). Teachers are often challenged with differentiation because they view DI as algorithmic, or a lock-step process, instead of heuristic, or a philosophical approach that incorporates several effective teaching strategies and methods (Tomlinson, 2014). Instead of a confining, lock-step process, DI employs teachers in the decision-making process (Bondie, 2019). Teachers learn alongside their students, adjusting and modifying their instructional approach in response to their

students' responsiveness to the lessons. Instead of a single decision or series of decisions made while preparing the unit, DI necessitates ongoing data-informed decisions (Bondie, 2019; Tomlinson, 2014; Tomlinson & Moon, 2013).

Teachers also viewed DI with trepidation because they envisioned a complex instructional strategy (van Geel et al., 2019). Evidence indicated that ambiguity encircled the modifications required to effectively implement DI practices and make data-informed instructional decisions (Park & Datnow, 2017; van Geel et al., 2019). The one-size-fits-all approach to teaching also seemed to apply to teachers' view of DI practices. Instead, the decisions required to implement DI should reflect teachers' philosophical and pedagogical approach to teaching (Tomlinson, 2014; van Geel et al., 2019). The complex instructional strategy label may also stem from the fact that, according to Tomlinson (2014), DI is a philosophical approach and not a lock-step process. Instead, DI's fluid nature requires teachers to modify lessons and implement instructional strategies based on learners' data (Tomlinson, 2014; van Geel et al., 2019).

**Institutional Barriers**. The leading institutional barriers to differentiation among gifted-trained and regular classroom teachers were inflexible curriculum, time, and insufficient support to implement differentiation (Bondie et al., 2019; Dack & Triplett, 2020; Johnsen et al., 2020; Wan, 2017; Whitley et al., 2019). Teachers cited a lack of resources as a barrier impeding the implementation of DI practices (Bondi et al., 2019; Whitley et al., 2019). Teachers listed technology as a specific need to reduce the amount of time required to implement differentiated instruction and analyze the data needed to effectively monitor students' progress (Benny & Blonder, 2016; Bondi et al., 2019).

Teachers also needed a sense of agency, or control, in their decision-making and goal-setting processes (Bondie et al., 2019). The assertion that teachers needed a sense of agency aligns with Bandura's (1993) self-efficacy theory. Individuals need to feel that their efforts enact change in their environment. Teachers' sense of agency varied, with many schools moving curriculum decisions to the institutional level and implementing a rigid curriculum guide (Bondie et al., 2019; Dack & Triplett, 2020). The rigidity of the guide also served to impede teachers' DI implementation (Wan, 2017). Although some preservice teachers entered the field prepared to implement DI, the school environments, constraints, and demands decreased their use of DI strategies in their practices (Dack & Triplett, 2020). The curriculum's pace and high-stakes testing demands left teachers feeling pressured to push forward without addressing learners' needs (Benny & Blonder, 2016; Dack & Triplett, 2020). Clark (2020) noted similar changes among first-year teachers. The novice teachers felt less efficacious about their ability to implement DI practices after entering the field (Clark, 2020). The drop in DI implementation may indicate an institutional issue.

**Implementation**. Teachers cited a lack of flexibility in the mandated curriculum (Johnsen et al., 2020). Although some of the gifted-trained teachers used concepts to guide their curriculum, the majority of the mathematics teachers in Johnsen et al.'s (2020) study focused instead on procedural knowledge. The focus on procedural knowledge limits and may inhibit the transfer of the knowledge to other content areas (Wiggins & McTighe, 2005). Curriculum driven by learners' interests rarely occurred (Johnsen et al., 2020). The curriculum seemed to limit teachers' ability or willingness to vary the pace (Dack & Triplett, 2020; Johnsen et al., 2020). The high-stakes testing focus served as the guide for pace instead of learner needs leading teachers to view the testing focus as a barrier to DI implementation (Dack & Triplett, 2020;

Johnsen et al., 2020). Data-driven decision-making rarely occurred and might reflect the desire to adhere to the district's curriculum or teachers' low self-efficacy in their data-informed decision-making skills (Johnsen et al., 2020; Wan, 2017). Because of strict adherence to the curriculum, teachers did not provide appropriately challenging OTL to advanced learners (Johnsen et al., 2020). All learners remained on the same task without acceleration or advanced learning opportunities. Instead, students and their families created advanced OTL to foster growth (Johnsen et al., 2020).

Gifted-trained teachers and regular classroom teachers who teach gifted learners often did not consider learner preference to help gifted learners gain a deeper understanding of the objective and did not embed critical thinking skills in the lessons (Johnsen et al., 2020; VanTassel-Baska et al., 2020). Gifted learners in regular classroom settings often did not receive differentiated OTL due to ineffective grouping (VanTassel-Baska et al., 2020). Some teachers also did not communicate the objective or connect it to a big idea which facilitates transfer (Johnsen et al., 2020; Tomlinson, 2017; Tomlinson & McTighe, 2006; Wiggins & McTighe, 2005). Even though teachers employed a variety of tasks, the connection between the tasks and a big idea or object was not evident (Johnsen et al., 2020).

Teachers often used summative assessments instead of incorporating formative assessments to guide their instruction (Wan, 2017). Preservice teachers expressed concern over the idea of fair versus equity in their use of differentiated assessments (Wan, 2016). In-service teachers also seemed to misunderstand the use of differentiated assessments (Wan, 2017). The assessments were summative and not formative (Wan, 2017). Tomlinson's model includes a variety of assessments incorporating ongoing formative assessments to drive instructional practices (Tomlinson & Moon, 2013). Teachers seemed to gravitate toward assessments of

student learning instead of assessing to enhance and guide student learning (Tomlinson & Moon, 2013; Wan, 2017). Differentiation uses assessments to guide instructional activities and make grouping decisions (Tomlinson, 2014).

Even though some teachers integrated grouping, few used assessments for group placement, choosing instead to group according to gifted identification, grade level, or incorporated mixed ability groups within the heterogeneous class (Johnsen et al., 2020; Park & Datnow, 2017). Gifted learners often served as substitute teachers in the mixed-ability groups (Bernal, 2003; Johnsen et al., 2020; Park & Datnow, 2017). Although the practice of using a more knowledgeable peer facilitated for Vygotsky's ZPD, it appeared that the teacher overlooked gifted learners' needs (Johnsen et al., 2020; Vygotsky, 1978). Within the groups, teachers used the same activities without accommodating ability levels (Johnsen et al., 2020). Some teachers seemed reluctant to transition from a teacher-centered to a student-centered environment (Brigandi et al., 2019).

**Teacher Beliefs**. Teachers' ability to be open to approaching learning using more than one method or instructional strategy is vital to successful DI implementation (Brigandi et al., 2019; van Geel et al., 2019). However, teachers' view of gifted education mirrored that of traditionally structured classrooms (Brigandi et al., 2019). The traditional view espoused close adherence to predesigned curriculum instead of allowing gifted learners a greater sense of autonomy using a responsive differentiated curriculum to provide appropriately challenging OTL (Brigandi et al., 2019; Sousa & Tomlinson, 2018). Although willing to support high-ability learners, some teachers do not see the value of differentiating at an advanced academic level (Benny & Blonder, 2016; Dijkstra et al., 2017). Valuing all students and their ability to learn—including advanced learners—is a major philosophical tenet of Tomlinson's (2014) model.

Differentiation also includes a "teaching up" approach to planning which designs units and OTL for advanced learners first (Tomlinson, 2014). Teachers then adapt the lesson according to the readiness and ability level of the remaining learners. However, some teachers seemed to focus their efforts on struggling learners (Benny & Blonder, 2016; Dijkstra et al., 2017; Johnsen et al., 2020). The focus on learners labeled as struggling without differentiating according to ZPD and readiness may reduce the number of appropriately challenging OTL for advanced learners (Sousa & Tomlinson, 2018; Tomlinson, 2014; Vygotsky, 1978).

**Positive Results**. Although teachers identified barriers to DI implementation, evidence indicated that DI practices positively affected student learning (Goddard et al., 2019; Prast et al., 2018; Puzio et al., 2020; Smale-Jacobse et al., 2019). When teachers felt supported by their administrators, DI usage increased (Goddard et al., 2019; Puzio et al., 2020). Students' academic performance also showed significant increases in concert with increased DI usage (Goddard et al., 2019; Puzio et al., 2020). Goddard et al. (2019) noted a significant positive predictive relationship between DI implementation and math ($\Upsilon = .22$, $p = .032$) and reading ($\Upsilon = .33$, $p = .003$) academic performance. Prast et al. (2018) asserted that DI professional development also increased student academic performance. However, the academic gains seemed fleeting, indicating no long-term effects for the professional development for year two ($\beta = -0.06$, $p = .665$).

**Provision of Training and Preparedness**

TEPs provided varying degrees of exposure to DI pedagogy (Dack et al., 2019a, 2019b). Although preservice teachers' exposure to DI vacillated, they expressed commitment to implement DI in their practice (Evans-Hellman & Haney, 2017). In-service teachers also expressed barriers to their DI implementation, which included additional and sustained training

and support (Bondie et al., 2019; Brigandi et al., 2019). Despite teachers' varied exposure to DI training, promising TEP and in-service training options improved DI implementation (Brigandi et al., 2019; Darling-Hammond, 2006a, 2006b; Vreys et al., 2018).

### *Teacher Education Programs*

Despite the established practice of DI in K-12 classrooms, post-secondary institutions employed limited DI usage (Bolens et al., 2018; Darling-Hammond, 2006b; Evans-Hellman & Haney, 2017; Melese, 2019; Santangelo & Tomlinson, 2009). Familiarity with and modeling of DI between certification areas varied significantly (Dack, 2019a; Evans-Hellman & Haney, 2017). Preservice teachers noted that their exposure to DI lacked depth and did not represent true differentiation (Brigandi et al., 2019; Dack, 2019a). Surprisingly, given the mixed level of exposure to DI, preservice teachers indicated their intent to implement DI practices in the field (Evans-Hellman & Haney, 2017). Their plan supported previous studies that failed to find a connection between modeling during instruction and planned implementation (Evans-Hellman & Haney, 2017). However, the effective implementation of DI without proper exposure to modeling and instruction may affect mastery learning and the fidelity of DI implementation (Bandura, 1977; Tomlinson, 2017). The varying degree of DI modeling may reflect the limited knowledge of differentiated practices that existed among post-secondary schools of education instructors (Melese, 2019).

Although TEP instructors displayed a positive attitude toward DI, some possessed a limited or surface-level understanding of the theories, models, and principles supporting DI (Ginja & Chen, 2020; Melese, 2019). Few professors, including TEP professors, implemented DI in their classrooms (Boelens et al., 2018; Evans-Hellman & Haney, 2017; Ginja & Chen, 2020; Melese, 2019). Professors continued to use lecture and assessment as the prevailing pedagogy

and failed to fully engage all learners (Melese, 2019). The professors pointed to several limiting factors for the use of DI (Ginja & Chen, 2020; Melese, 2019). Time constraints, class size, and workload were among the reasons for not adapting their pedagogy to include differentiation (Ginja & Chen, 2020; Melese, 2019). The implementation barriers cited by education professors mirrored those noted by in-service teachers (Bondie et al., 2019; Johnsen et al., 2020; Melese, 2019). Preservice teachers noted the inconsistency and perpetuation of DI misconceptions in their coursework (Dack, 2019a). The lack of DI modeling is troubling as professors in TEPs influence future teachers' methodology. Therefore, applying theory to practice should be an instructional priority for TEPs.

**Exemplary Teacher Education Programs.** The body of research identifying exemplary TEPs remains limited. The leading researcher, Darling-Hammond (2006a, 2006b), identified the characteristics of exemplary TEPs. Coherence and integration between courses, the connection between theory and practicums, and extensive clinical work enhanced through collaboration with schools created a rich environment that fostered preservice teacher development (Darling-Hammond, 2006a). Sequenced coursework supported by professor collaboration created an ideal environment to learn to teach (Darling-Hammond, 2006a). Canrinus et al. (2019) indicated the importance of communicating the program's coherence. Candidates' perception of coherence hinged on effective communication between the TEP's stakeholders (Canrinus et al., 2019). Field experience inclusion proved to be the major difference between the TEPs (Canrinus et al., 2019).

The second component involved extensive clinical work closely supervised and integrated with coursework (Darling-Hammond, 2006a). The clinical work provided the opportunity to put theory into practice to explore and use emerging pedagogies (Darling-

Hammond, 2006a). Deliberate and thoughtful application of theory in practice nurtured teachers' action research or metacognition (Huang, 2015). Traditional TEPs taught theory through coursework, only integrating theory to practice opportunities after the program's completion (Darling-Hammond, 2006a). In contrast, exemplary TEPs interspersed field experience throughout the TEP's course of study (Darling-Hammond, 2006a). Successful TEPs also used one-year practicums instead of typical short-term practicums (Darling-Hammond, 2006a; Gossman & Horder, 2016; Reynolds et al., 2016). In the successful programs, preservice teachers engaged in practical field experiences that transferred classroom knowledge into practical situations (Darling-Hammond, 2006a). However, preservice teachers noted the inconsistent modeling of DI in the field (Dack, 2019a). The exposure to DI that contradicted the tenets of differentiation necessitates in-service teacher training or university-to-school partnerships (Darling-Hammond, 2006a).

The final component of successful exemplary TEPs involved collaboration between schools and universities (Darling-Hammond, 2006a). Baylor University and the Midway school district's partnership embodied this ideal (McCall et al., 2017). The coherent program fostered two-way communication between the stakeholders of Baylor University's TEP (McCall et al., 2017). However, some contend that the challenges of creating partnerships similar to the Baylor University program led to weak and ineffective pseudo partnerships instead of reciprocal programs (Grudnoff et al., 2017). Another field experience approach involved creating a third space for preservice teachers to learn to teach (Grundoff et al., 2017). This idea stood in contrast to the authentic field experience supported by other researchers (Dack, 2019a, 2019b; Darling-Hammond, 2006a, 2006b; Duquette, 2016; Reynolds et al., 2016). Theory to practice creating mastery learning opportunities succeeds when the learning environment facilitates the learning

experience (Bandura, 1977; Darling-Hammond, 2006a). Continuous and relevant feedback throughout the practicum enriched the experience and facilitated mastery (Bandura, 1977; Darling-Hammond, 2006a; Duquette, 2016).

**Teacher Education Programs, Preservice Teachers, and DI.** Evidence pointed to a lack of cohesion between DI theory and practice among some TEPs (Dack, 2019a; Evans-Hellman & Haney, 2017). Building on the study of Darling-Hammond (2006a, 2006b), Dack (2019a) conducted a qualitative study of the coherence of a TEP and the effectiveness of coursework devoted to the Tomlinson model of differentiation (Tomlinson, 2017). The disconnect between coursework and practicum experience weakened TEPs (Darling-Hammond, 2006a; Dack, 2019a; Grudnoff et al., 2017). Dack noted a positive connection between preservice teachers' experiences with differentiation and an in-depth study of Tomlinson's model (Dack, 2019a, 2019b; Tomlinson, 2017). Although Dack's (2019a, 2019b) research added to the growing body of literature on effective DI implementation and TEPs, the study did not address the correlation between the course and field experience. Limitations arose from a key component of applying the pedagogical approach (Dack, 2019a, 2019b). All but one participant had completed field experience before enrolling in the differentiation course (Dack, 2019a). Therefore, preservice teachers' perceptions, not actual field experience, served to validate the findings (Dack, 2019a). Infusing practicum experience into the study of Tomlinson's (2017) model would have provided an authentic examination of the connection between theory and practice. However, Dack's methodology provided insight into the evolving level of understanding of a pedagogical approach to learning (Dack, 2019a).

Preservice teachers possessed limited knowledge of differentiated instruction before participating in DI training (Dack, 2019b; Wan, 2016). TEP students expressed concerns over

misconceptions of differentiated instructional practices and displayed inaccurate representations of the practice (Dack, 2019a; 2019b). One student noted that differentiation resembled an empty catchphrase with little meaning attached (Dack, 2019a). Preservice teachers' limited knowledge supported Tomlinson's (2017) assertion that common misconceptions surround the definition of differentiation. However, after training, preservice teachers expressed a deeper understanding of differentiation (Dack, 2019a; Wan, 2016).

Although training clarified the misconceptions, preservice teachers also noted the importance of authentic field experience (Wan, 2016). The need for field experience supported Darling-Hammond's inclusion of quality field experience as part of a cohesive program (Dack, 2019a; Darling-Hammond, 2006a). However, some noted ineffective modeling by their supervising teacher (Dack, 2019a). Modeling and direct instruction of DI also varied according to instructors' level of DI understanding and philosophical beliefs (Evans-Hellman & Haney, 2017; Melese, 2019). Preservice teachers also noted the need for cohesion among courses and between their coursework and field experience (Dack, 2019a). Most characterized their exposure to differentiation as vague and lacking support (Dack, 2019a, 2019b). Preservice teachers' varied and limited exposure to DI and supporting instructional methods underscores the need to improve TEP's inclusion of in-depth theory instruction and translate it into preservice teachers' practice (Darling-Hammond, 2006a).

### *In-service Teachers*

Like preservice teachers, in-service teachers expressed concerns over a lack of effective training and exposure to DI (Bondie et al., 2019; Brigandi et al., 2019). Evidence suggested that successful DI training included a prepared curriculum in connection with ongoing DI training (Johnsen et al., 2020). Although gifted training examined gifted learners' needs and

characteristics and instructional strategies that work best with gifted learners, gifted-trained teachers may also need additional support implementing DI (Johnsen et al., 2020).

Providing resources such as assessments and instructional materials on varied levels may ease the time constraint noted by many teachers as numerous schools utilized heterogeneous grouping and regular classroom delivery of gifted services (Bondie et al., 2019; Johnsen et al., 2020). In addition, teachers noted the need for supportive leadership and ongoing professional development (Bondie et al., 2019). Johnsen et al. (2020) also stated the need for judgment-free time to experiment with DI. Bandura's assertion of the need to provide mastery experiences in a setting that eases the fear of failure supports this approach (Bandura, 1993; Johnsen et al., 2020).

Teachers cited a lack of knowledge and that their TEPs did not prepare them to implement DI (Wan 2017). However, evidence indicated that mere DI knowledge did not increase teachers' perceived DI self-efficacy (Moosa & Shareefa, 2019). Differentiated instruction also did not increase as the level of education increased (Moosa & Shareefa, 2019). The relationship proved more intricate and intertwined. Teachers' experience, content area knowledge, a firm understanding of DI pedagogy, and mastery opportunities improved DI implementation. The possession of knowledge does not always equate to a strong sense of self-efficacy in the ability to use the knowledge effectively (Bandura, 1977). Although teachers held an overall positive view of DI, the view did not translate to their praxis (Wan, 2017). However, gifted training provided an effective means of increasing teachers' knowledge of gifted learners and DI implementation (Vreys et al., 2018).

The NAGC (2015) emphasized professional development as vital for all teachers to better understand gifted learners and their needs. According to the NAGC, only one state stipulated required gifted education coursework for preservice teachers, and only five required all teachers

to participate in gifted education professional development. However, 19 states stipulated additional training resulting in gifted certification or endorsement for gifted programming teachers. Gifted training provided teachers with a greater understanding of gifted learners, their characteristics, and specific needs (NAGC, 2015; Vreys et al., 2018).

Differentiation originated as an instructional approach to meet gifted learners' academic needs and continues as the preferred method of meeting gifted learners' academic needs (Gheyssens et al., 2020; NAGC, n.d.d, 2015; Vreys et al., 2018). Vreys et al. (2018) implemented training that addressed misconceptions teachers hold about gifted children and the gifted program (Vreys et al., 2018). The training also focused on meeting gifted learners' needs in a heterogeneous classroom setting by using effective pedagogy and taught teachers how to recognize giftedness and gifted underachievers (Vreys et al., 2018). Post-training, the results indicated a significant shift in teachers' view that extra-curricular gifted OTL is not sufficient, ($p < .001$ at the 95% *CI*), and that differentiating to meet gifted learners' needs is feasible ($p < .001$ at the 95% *CI*). The training also sought to address perceived barriers expressed by many teachers to differentiation, such as limited resources, time, and support (Bondie et al., 2019; Dack & Triplett, 2020; Vreys et al., 2018). The training showed positive results with teachers compacting the curriculum as part of their differentiation (Vreys et al., 2018). Compacting curriculum involves adjusting the content for students who demonstrated mastery and need advanced options or enrichment (NAGC, n.d.d). Although the training elicited positive change, the limited number of teachers receiving gifted training continues to present challenges (Vreys et al., 2018).

Although professional development prompted progress, the training sometimes failed to lead to complete DI implementation (Bringandi et al., 2019). Additional research in professional

development and gifted education is needed to address the connection between differentiated instruction professional development and gifted education (Brigandi et al., 2019). A special focus on research-based enrichment programs to improve our understanding of the measures that prepare educators to meet gifted learners' needs is needed (Brigandi et al., 2019). The needed research includes teachers at multiple levels of experience and training. Evidence indicated a need to improve the cohesiveness of TEPs to prepare preservice teaches to put theory into practice effectively (Evans-Hellman & Haney, 2017; Melese, 2019; Moosa & Shareefa, 2019). Finally, evidence also indicated the importance of TEPs and in-service training to improve DI implementation (Bringandi et al., 2019; Dack 2019a, 2019b; Dijkstra et al., 2017).

## Summary

Bandura's self-efficacy theory connected to the issues observed in TEP and in-service teachers' perception of their DI ability. Several researchers indicated the positive relationship between teachers' sense of self-efficacy and their ability to implement DI. The strength of teachers' self-efficacy reflected their belief that their students' academic performance and behavior improved through their efforts and implementation of instructional strategies. Knowledge and mastery learning experiences increased self-efficacy. Therefore, the need for training specific to meeting the needs of gifted and advanced learners using DI warrants further research. DI's provision of appropriately challenging OTL may also mediate the underrepresentation of students of color and students originating from socioeconomically disadvantaged homes.

Poverty and racial/ethnic disparities negatively affected the academic achievement of many students across the United States. Underrepresentation of students of color in gifted education has continued despite attempts to amend the disparity. Current identification practices

systematically failed to identify giftedness across cultures. Because of the educational opportunities available through gifted programs and the effect on future educational opportunities, educators and researchers explored factors contributing to the disproportionate participation rates of students of color and students originating from under-resourced homes.

Several factors affected the disproportionate identification rates of students of color. A lack of resources reduced the educational opportunities for students of color to engage in meaningful learning activities. Researchers examined the identification process and the role of teachers and assessments. A lack of federal oversight led to state-level control of the identification process and policies. The use of parent nominations and teacher nominations proved problematic in effectively identifying giftedness in students of color, ELL students, and students originating from under-resourced homes. The identification process varied across states, with most states relying on nominations and referrals from teachers and parents as the initial step toward identification. Researchers also examined the effectiveness of tests and state mandates for gifted identification and participation. Variations and inadequacies existed in the tests used to assess giftedness and intelligence.

Researchers also explored the definition of giftedness and effective means of assessing it through the application of intelligence theories and gifted education models. The expansion of the narrow view of intelligence to include multiple types of intelligence created a more culturally responsive view of giftedness. However, many of the assessments and procedures currently used do not effectively reflect the expanded view. Inequitable distribution of resources and reduced OTL negatively affected the academic achievement of students of color. Factors such as language, test bias, policy, and poverty had an adverse effect on the identification rate contributing to the current disparity in students of color's participation rates.

Researchers explored promising practices and policy changes, including intervention and alternative assessments. Interventions included enrichment activities and structured courses that enabled students to enroll in higher-level courses and meet the cutoff for gifted identification. The alternative assessments included culturally responsive assessments and adapted use of teachers' input. Advanced OTL remained inaccessible for a large portion of students of color affected by the social construct of poverty. Although studies examined the effect of race/ethnicity and poverty on academic achievement, few studies examined how the intersection of race/ethnicity and poverty affected the gifted identification of students of color. A gap exists in the literature examining the interrelated nature of the gifted identification process, poverty, race/ethnicity, and the influence these factors have on students of color's participation in gifted education.

Some researchers studied the intersection of poverty and race/ethnicity and its effect on education; however, the topic warrants additional research regarding the influence these factors have on gifted identification. Gifted identification is a multifaceted process that varies across districts and states. Participation in gifted education programs affords students the opportunity to participate in challenging and advanced coursework. The effect of excluding students of color and students originating from socioeconomically disadvantaged homes from gifted education programs extends beyond their K-12 educational experiences. Participation in advanced courses opens up the opportunity for post-secondary studies. Examining the effects of the selection/identification process on historically underrepresented students' participation in gifted education and the intersection of race/ethnicity and poverty leads to a greater understanding of their effect on disproportionate identification rates of underrepresented students.

Several studies addressed teacher self-efficacy and teachers' use of DI, but a dearth of current research exists on the relationship to gifted training, teacher's self-efficacy, and DI implementation. The existing evidence is also conflicting and shows varying degrees of implementation among gifted trained teachers. In addition, the connection between self-efficacy, DI, and the provision of OTL to mediate the gifted underrepresentation of students affected by the intersection of race, ethnicity, and poverty is also limited. The majority of research focused on ways to utilize identification methods differently in response to cultural differences and varying degrees of access to quality OTL.

Although various researchers examined the alternative paths to gifted identification of historically underrepresented students, some believe the focus should shift to intervention. The achievement gap attributed to unequal access to quality OTL across SES status and race may hold the key to addressing underrepresentation. The provision of appropriately challenging OTL through differentiation affords students the chance to uncover and hone their academic skills and improve their chances of participating in gifted programming and advanced courses. However, the problem exists that DI implementation varies despite the evidence supporting the positive effect of its use. Teachers' perception and use of DI often reflected feelings of unpreparedness and perceived barriers. Therefore, the use of differentiation and teachers' perceptions of preparedness to implement the practice warrants further research.

# CHAPTER THREE: METHODS

## Overview

This chapter provides an overview of the overall design of the study. The study examined the relationship between teachers' self-efficacy, teachers' perceptions of differentiated instruction (DI), and teachers' frequency of use of DI practices compared between two groups of teachers—teachers with gifted endorsement and teachers without gifted endorsement. The chapter also describes the identified target population, sample, and sampling technique and validates the choice of the participants and setting. A predictive correlational design fit the study's purpose to examine possible relationships between teachers' self-efficacy, their perceptions of DI, and the frequency of their implementation of DI strategies, and gifted endorsement. The chapter also includes descriptions of the instruments used to assess the relationships and the instruments' validity. Finally, the procedures, research questions, hypotheses, and data analyses will be discussed.

## Design

The non-experimental quantitative predictive study examined the relationship between three quantitative variables and gifted endorsement (Gall et al., 2007). Studies seeking to examine the predictive relationship between two factors or variables employ a predictive correlational design (Creswell & Guetterman, 2019; Gall et al., 2007). The predictive correlational design fit the study's needs in examining the relationship between teachers' self-efficacy, their perceptions of DI, and the frequency of their implementation of DI strategies, and gifted endorsement (Warner, 2013). Although a causal-comparative study would also fit, the complex nature of implementing differentiated instruction (Gheyssens et al., 2020; van Geel et al., 2019) may affect the relationship between the identified variables in the study. The study also

sought to examine the predictive nature between gifted endorsement, self-efficacy, teachers' perceptions of differentiated instruction (DI), and the frequency of teachers' implementation of DI practices; therefore, a predictive correlational design with bivariate correlation analysis with regression was the best fit for the current study's purposes (Warner, 2013).

Predictive correlational research examines the possible predictive relationship between two variables, a predictor and a criterion variable, and determines the strength of the correlation (Creswell & Guetterman, 2019; Gall et al., 2007; Warner, 2013). The current study applied a dichotomous predictor variable to assess the possible predictive relationship between gifted endorsement and the criterion variables, teachers' self-efficacy, teachers' perceptions of DI, and teachers' frequent implementation of DI practices (Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001). Researchers chose correlational designs to examine the relationship between teachers' self-efficacy and their perceptions and implementation of DI (Moosa & Shareefa, 2019; Ramli & Yusoff, 2020). Ramli and Yusoff (2020) utilized a cross-sectional correlational design to examine teachers' self-efficacy and differentiated instruction perceptions and implementation using the *TSES* and *TPUDIP*, respectively (Knight, 2016; Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001). The current study utilized a dichotomous predictor variable, gifted endorsement delineated by teachers with gifted endorsement and teachers without gifted endorsement, and three criterion variables—teachers' sense of self-efficacy, teachers' perceptions of DI, and teachers' frequent implementation of DI instructional strategies measured using *TSES* and *TPUDIP* scores to examine the variables' relationships (Knight, 2016; Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001).

Teacher's sense of self-efficacy, or teacher efficacy, represents the educator's belief in his or her ability to instruct others and bring about change (Bandura, 1977, 1993, 1997; Gist &

Mitchell, 1992). Teacher's sense of self-efficacy influences motivation, depression, praxis, and promotes a positive learning environment (Bandura, 1993; Künsting et al., 2016; Tschannen-Moran & Hoy, 2001). Self-efficacy also positively influences the willingness to engage and persist in an activity even when situational challenges arise (Bandura, 1977, 1986). Tschannen-Moran and Hoy (2001) measured teachers' sense of efficacy on three constructs—student engagement, instructional strategies, and classroom management. The three constructs allow for comparisons across grade levels and subject areas (Tschannen-Moran & Hoy, 2001). Numerous studies administered Tschannen-Moran's and Hoy's (2001) teachers' sense of self-efficacy scale (*TSES*) to assess teachers' sense of self-efficacy (Dixon et al., 2014; Moosa & Shareefa, 2019; Ramli & Yusoff, 2020; Tschannen-Moran & Hoy, 2001; Zee & Koomen, 2016).

DI involves adapting the curriculum to reflect students' diverse academic needs, intelligences, interests, learning style preferences, and cultural differences (Gardner, 2011; Kaur et al., 2019; Tomlinson, 2017). Modifying the content, process, product, and environment reflects a proactive and responsive approach to teaching, understanding that individuals take various approaches to learning (Sousa & Tomlinson, 2018; Tomlinson, 2017). Several studies assessed preservice and in-service teachers' knowledge and implementation of DI (Dack, 2018, 2019b; Gheyssens et al., 2020; Moosa & Shareefa, 2019; Pozas et al., 2020). The teachers' perceptions and use of differentiated instructional practices (*TPUDIP*) inventory measures teachers' perception of DI and their frequency of implementation (Knight, 2016; Santangelo & Tomlinson, 2012). The instrument measures teachers' perceptions of the importance of the construct of learner characteristics delineated by readiness, interest, and learner profile and the construct of frequency of implementation (Santangelo & Tomlinson, 2012).

The study's predictor variable was dichotomous, with group membership based on gifted endorsement. For the purpose of this study, the definition of gifted endorsement relied on the South Carolina Department of Education's (SCDE) requirements for basic gifted endorsement (SCDE, 2021b). The SCDE requires teachers seeking gifted endorsement to complete two courses from one of three specified universities. The courses include instruction on the gifted learners' characteristics and needs and the gifted curriculum (SCDE, 2021b). The predictor variable was coded 0 for teachers with gifted endorsement and 1 for teachers without gifted endorsement.

The SCDE (2021c) defined poverty using the number of homeless students for the current year, the number of students enrolled in Medicaid, Supplemental Nutrition Assistance Program (S.N.A.P.), Temporary Assistance for Needy Families (T.A.N.F.), and the number of students enrolled in foster care for a three-year period. The districts provided quarterly student headcounts for each school year disaggregated by race, gender, number of students living in poverty. According to the SCDE (2021c), the count satisfies federal and state regulations. NCES (2019) noted that student eligibility for the free or reduced-price lunch program defines medium to high poverty schools as those with 50.1% to 75% of the student enrollment deemed eligible for the program. For the purpose of this study, the SCDE's (2021c) determining factors and the NCES (2019) definition of high-poverty schools determined the poverty level of the school districts.

SCDE (2021b) uses criteria from three dimensions to define gifted students. The students must satisfy two of the three dimensions—(A) high aptitude, (B) high achievement, and (C) intellectual or academic performance. The state uses a multi-step process. Universal screening occurs in second grade using the Cognitive Abilities Test (CogAT) and the Iowa Assessments

(IA) (Riverside Insights, 2020; SCDE, 2021b; The University of Iowa, 2020). Students scoring in the 93rd or higher percentile in at least one area on the CogAT (Riverside Insights, 2020) on the verbal, mathematics, nonverbal, or composite of the three areas satisfy Dimension A (SCDE, 2021b). Students scoring in the 94th percentile or higher on the IA (The University of Iowa, 2020) satisfy Dimension B (SCDE, 2021b). Students must exhibit high levels of interest in their academics and display character traits such as curiosity, reflection, persistence, or creativity (SCDE, 2021b). The state uses a Performance Task Assessment (PTA), and students scoring at least 16 on the PTA satisfy Dimension C. The PTA uses open-ended problems to measure students' ability to solve and explain their reasoning. The SCDE (2021b) also utilizes Gifted Identification Forms and Tasks software to assess the CogAT (Riverside Insights, 2020) and IA (The University of Iowa, 2020) scores and identify students who qualify for the Gifted and Talented program. Although the SCDE (2021b) noted that screening represents a component of the identification process, the SCDE's website did not provide further details.

## Research Question(s)

**RQ1:** Can gifted endorsement predict the level of teachers' sense self-efficacy as measured by *Teachers' Sense of Efficacy Scale* among teachers in schools that offer gifted programming?

**RQ2**: Can gifted endorsement predict teachers' perspective of differentiated instructional practices as measured by *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?

**RQ3**: Can gifted endorsement predict teachers' frequency of implementation of differentiated instructional practices as measured by *Teachers' Perceptions and Use of*

*Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?

## Hypotheses

The null hypotheses for this study are:

**$H_{01}$:** There is no significant predictive relationship between the criterion variable teachers' sense of self-efficacy as measured by the *Teachers' Sense of Efficacy Scale* and the predictor variable gifted endorsement.

**$H_{02}$:** There is no significant predictive relationship between the criterion variable teachers' perspective of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* and the predictor variable gifted endorsement.

**$H_{03}$:** There is no significant predictive relationship between the criterion variable teachers' frequency of implementation of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* and the predictor variable gifted endorsement.

## Participants and Setting

The researcher selected the study's participants from a random sample of K4 through grade 12 teachers in four school districts in northwestern South Carolina who offer gifted programming and serve a large percentage of students originating from under-resourced homes. School District 1 (pseudonym) is a medium-sized culturally diverse school district with an elevated (69.3%) student population poverty rate (SCDE, 2021a, 2021c; SD1, n.d.). School District 2 (pseudonym) is a large culturally diverse school district also serving an elevated (66.3%) student population originating from under-resourced homes (SCDE, 2021a, 2021c; SD2,

n.d.). School District 3 (pseudonym) is a small school district with an elevated (72.0%) student population poverty rate (SCDE, 2021a, 2021c; SD3, 2021). School District 4 (SD 4) is a large school district with 65.8% of the student population originating from under-resourced homes (SCDE, 2021a, 2021c; SD4, n.d.). The four school districts are autonomous with separate superintendents and school boards (SD1, n.d.; SD2, n.d.; SD3, 2021; SD4, n.d.). The school districts' teacher descriptive data is shown in Table 1.

**Table 1**

***District Data Reported 2020-2021 School Year***

| Descriptor | School District 1 | School District 2 | School District 3 | School District 4 |
|---|---|---|---|---|
| Number of teachers | 223 | 850 | 66 | 777 |
| Student Enrollment | 2,924 | 12,771 | 934 | 10,168 |
| Percentage of students served by gifted programming | 13.70 | 28.50 | 6.50 | 180 |
| Average salary | $50,414.00 | $51,154.00 | $48,002.00 | $54,713.00 |
| Percentage of teachers holding advanced degrees | 64.91 | 58.38 | 54.20 | NA |
| Percentage of inexperienced teachers in core classes | 11.70 | 25.1 | 18.40 | 14.40 |
| Percentage of out-of-field teachers in core classes | 1.90 | 1.90 | 5.30 | 2.30 |
| Percentage of teachers returning from previous year | 88.60 | 83.80 | 92.10 | 91.70 |

*Note*. The data reflects the comparative size difference and academic environment. The data is from the South Carolina Department of Education (SCDE, 2021c). The data for the current 2021-2022 school year was unavailable.

The sample size for this study was 108 participants with 38 teachers with gifted endorsement and 70 teachers without gifted endorsement. Gall et al. (2007) noted that in a sample with a medium effect size, alpha = .05, and statistical power of .70, studies require a minimal sample size of 66. However, Warner (2013) asserted that correlations should include a minimum sample size of 100 to ensure statistical power and mediate the effects of bivariate outliers. Therefore, the target sample size for this study ranged from 66 to 100 with approximately 33 to 50 participants for each group. The study sought to reject the null or fail to reject the null with a higher degree of certainty; therefore, a minimal sample size of 66 was sought (Gall et al., 2007). Because the study focused on two groups of educators, teachers with gifted endorsement (GTT) and teachers without gifted endorsement (NGTT), and the limited number of responses, the researcher included all complete surveys in the analyses. The sample contained108 respondents; 38 with gifted endorsement and 70 without gifted endorsement.

The sample was selected from four school districts in northwestern South Carolina that offer gifted programming. The sample represents teachers across multiple grade levels and subject areas and includes expanded demographic data reflecting years of experience, DI training, and gifted endorsement. The comprehensive grade level, subject area range, and demographic data choices expanded the current demographic data in the body of literature (Poulou et al., 2019; Wan, 2016). Table 2 denotes demographic data for the sample. The sample was selected using random sampling. All fully complete surveys were selected. The researcher accepted all completed surveys due to the low number responses especially among the small gifted endorsed teacher population within the school districts.

**Table 2**

***Sample and Target Population Demographic Data***

| Descriptor | | Target Population* | Sample | |
|---|---|---|---|---|
| Number of gifted endorsed teachers (GTT) | | Data Not Available | 38 | |
| Number of teachers without gifted endorsement (NGTT) | | Data Not Available | 70 | |
| Total | | 1,923 | 108 | |
| | | | GTT | NGTT |
| Race/Ethnicity | Asian | 4 | 00 | 00 |
| | Black/African American | 104 | 2 | 4 |
| | Native American | 2 | 00 | 00 |
| | Latino | 21 | 00 | 00 |
| | White | 1,724 | 36 | 65 |
| | Two or More Races | Not Reported | 00 | 1 |
| | Race Not Reported | 50 | 0 | 0 |
| Gender | Male | 344 | 8 | 12 |
| | Female | 1,378 | 30 | 58 |
| | Gender not Reported | 5 | 0 | 0 |

*Note*. The sample reflects that the majority of the responding teachers for the districts were white and female. The sample reflects the ethnicity and gender of the target population with the exception of the small Latino population.

*Target population ethnicity data was reported using latest SCDE (2021d) teacher data available from the 2019-2020 school year in the 2021 data release. The 2021-2022 data was unavailable.

However, the teacher return rate exceeded 80% for each district for two reporting years yielding the data a valid reflection of the target population.

The gap in the literature on DI and self-efficacy indicated the need to expand the demographic data providing a broader range of educators (Poulou et al., 2019; Wan, 2016). In addition, Brigandi et al. (2019) noted the need to further examine the relationship between professional development and gifted education as it relates to teacher preparation. Brigandi et al. (2019) further noted the need to expand the research to include multiple experience and training levels involved in meeting gifted learners' needs. The current study sought to include all subject areas and grade levels in four school districts that include gifted programming. Table 3 provides descriptive data for grade level placement and, Table 4 provides the descriptive data for subject area placement.

**Table 3**

***Grade Level Placement Data and Gifted Endorsement***

| Grade level | Sample | |
|---|---|---|
| | GTT | NGTT |
| K4 – K5 (Kindergarten) | 3 | 11 |
| 1st – 5th (Elementary) | 5 | 30 |
| 6th – 8th (Middle) | 23 | 20 |
| 9th-12th (Secondary) | 9 | 18 |
| Other | 3 | 2 |

*Note.* The sample's grade level disbursement represents the respondents' current grade level placement. The survey allowed for multiple responses to reflect teacher's possible placement across grade levels.

**Table 4**

***Subject Area and Gifted Endorsement***

| Subject Area | Sample | |
|---|---|---|
| | GTT | NGTT |
| Math | 16 | 30 |
| Science | 12 | 27 |
| ELA | 12 | 30 |
| Social Sciences | 6 | 28 |
| Special Education (SpEd) | 1 | 15 |
| Related Arts | 0 | 11 |
| Other | 3 | 5 |

*Note.* The sample taught across multiple subject areas. The survey allowed for multiple responses to reflect teacher placement across subject areas.

The special focus was on teachers with gifted endorsement. The SCDE (2018) included the implementation of differentiated curriculum, instruction, and assessments for gifted learners in their gifted programming best practices. Tomlinson (2017) also asserted that gifted and special education teachers typically differentiate their instruction. In addition, numerous gifted advocates and researchers identified DI as a best practice to effectively meet gifted learners' academic needs (Gheyssens et al., 2020; NAGC, n.d.d, 2015; Vreys et al., 2018). However, a review of the literature revealed conflicting evidence as to the effectiveness of gifted training in increasing DI implementation and improving teachers' views of gifted learners (Hansen & Feldhusen, 1994; Johnsen & Kaul, 2019; Miller, 2009; Tomlinson, 2014; Vreys et al., 2018). Therefore, the need

to examine the predictive relationship between gifted endorsement, teachers' sense of self-efficacy, teachers' perceptions of DI, and teachers' frequent implementation of DI is warranted.

## Instrumentation

This study employed survey instruments composed of Likert-type scales to assess teachers' self-efficacy, teachers' perceptions of DI, and their frequent implementation of DI practices. Studies often utilize surveys composed of Likert-type scales to assess participants' attitudes on a phenomenon or practice (Gall et al., 2007). Data collected from Likert-type scales do not satisfy the definition of ordinal and interval data (Warner, 2013). However, Warner (2013) noted that the Likert-type scale's score sums are often normally distributed, making parametric statistics applicable. The Likert-type scales assess participant's attitudes on questions about the phenomenon and offer a range of answer options from strongly disagree to strongly agree or not likely to very likely. The instrument should contain a minimum of 10 items for reliability (Gall et al., 2007). The *TSES* short form and *TPUDIP* have 12 and 60 questions, respectively (Knight, 2016; Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001).

The web-based survey tool, Qualtrics, administered the survey. An online survey allows researchers to collect data quickly and provides an effective and economical means of disseminating the instrument (Gall et al., 2007; Warner, 2013). However, the researcher must consider the possibility of non-random sampling, low response rates, and security breaches (Warner, 2013). The survey was sent to participants' school email addresses. The desired response rate was 50% or higher (Creswell & Guetterman, 2019); therefore, the researcher sent a reminder notification to the participants. No personally identifying data was collected during the survey completion in order to mediate security concerns. A separate survey form collected email addresses of participants who participated in the raffle for the gift cards. The email addresses and

participant responses were collected separately, not linked, and stored separately.

**Teachers' Sense of Self-Efficacy**

The researcher utilized two instruments to measure teachers' sense of self-efficacy and teachers' perceptions and frequent implementation of DI, respectively. The researcher employed the *Teachers' Sense of Efficacy Scale (TSES)* to measure teachers' self-efficacy (Tschannen-Moran & Hoy, 2001). See Appendix G for the instrument. The *TSES*' purpose is to assess teachers' sense of self-efficacy or belief in their ability to instruct others and bring about change (Tschannen-Moran & Hoy, 2001). The researchers developed the instrument at a seminar at Ohio State University to improve the measurement of teacher efficacy. The researchers noted the ineffective measures previously employed and sought to craft a more effective means to measure teachers' sense self-efficacy to reflect Bandura's (1993, 2006) teacher efficacy scale. The instrument's constructs reflect Bandura's (1993, 2006) teacher self-efficacy scale and measures in-service and preservice teachers' sense of self-efficacy (Tschannen-Moran & Hoy, 2001). The *TSES*, comprised of three subscales, has a long and a short form with eight and four items per subscale, respectively (Koniewski, 2019). Although much research focused on assessing preservice teachers' self-efficacy using the *TSES* (Tschannen-Moran & Hoy, 2001), evidence suggests it is a reliable measure across lower-secondary and primary teachers (Koniewski, 2019). Numerous studies used the instrument (De Neve et al., 2015; Dixon et al., 2014; Koniewski, 2019; Moosa & Shareefa, 2019; Ramli & Yusoff, 2020; Wilson et al., 2018). The short form met the current study's purpose due to the length of the instrument measuring DI.

The authors established construct validity by comparing the construct to other instruments used to measure teachers' self-efficacy (Tschannen-Moran & Hoy, 2001). The instrument measures teachers' sense of self-efficacy across three constructs—instructional,

classroom management, and student engagement. The instructional construct measures teacher's perceived ability to effectively assess student learning using several strategies, differentiate lessons, and offer varied explanations of the material. The classroom management construct measures teachers' perceived ability to address disruptive behavior effectively and organize and manage the classroom. The third construct, student engagement, measures teachers' perceived ability to involve learners in the lesson and increase their motivation to learn. The short and long forms were deemed valid (Tschannen-Moran & Hoy, 2001). The instrument's short-form consisted of 12 questions divided into three sections—efficacy for instructional strategies, efficacy for classroom management, and efficacy for student engagement—with four questions per section (Tschannen-Moran & Hoy, 2001). The responses were based on a nine-point Likert-type scale with answer choices anchored at "1—nothing, 3—very little, 5—some influence, 7—quite a bit, and 9—a great deal" (Tschannen-Moran & Hoy, 2001, p. 796). Each construct's score range was from 4 to 36, with a total score of 12 to 108 for the instrument. A score of 12 points is the lowest possible score meaning that the teacher is not efficacious in the three areas of instructional strategies, classroom management, and student engagement. The low score indicates the teacher's lack of belief in his or her ability to effect change in the classroom. Scores approaching 108 on the short form of the *TSES* indicate the teacher is efficacious in the three areas of instructional strategies, classroom management, and student engagement. The high score indicates the teacher's strong belief in his or her ability to effect change in the classroom. The *TSES* included participant directions as part of the instrument. See Appendix G for the instructions. The approximate time to complete the instrument is 12 minutes. The researcher scored the instrument and validated the scores using a spreadsheet and calculator. Tschannen-Moran and Hoy (2001) established the instruments' reliability through three studies and a

principal-axis factor and by calculating a total score for the instrument. The reliability for the short form was .90. The Cronbach's alpha ($\alpha$) for the three subsets instructional strategies, efficacy for classroom management, and efficacy for student engagement were .86, .86, and .81, respectively. See Appendix G for permission to employ the instrument as part of the current study.

**Teachers' Perceptions and Implementation of Differentiated Instructional Practices**

The instrument employed to assess teachers' perceptions and frequency of implementation of DI originated with Santangelo and Tomlinson's (2012) measurement of teacher educators' perceptions of DI and the frequency of their implementation of DI practices. The authors did not ascribe a name to the instrument. However, a doctoral study ascribed the name of the article, *Teachers' Perceptions and Use of Differentiated Instructional Practices* (*TPUDIP*), as the instrument's name (Knight, 2012; Santangelo & Tomlinson, 2012). See Appendix H for the instrument. The instrument's purpose was to measure teacher educators' perceptions and implementation of DI practices, but other researchers used the survey to assess in-service teachers as well as teacher educators (Ginja & Chen, 2020; Knight, 2016; Ramli & Yusoff, 2020; Santangelo & Tomlinson, 2012). The researchers crafted the instrument for a cross-sectional study and designed the instrument around Tomlinson's DI model (Santangelo & Tomlinson, 2012; Tomlinson, 2014, 2017). The inconsistent exposure to DI raised concerns of preservice educators entering the field to face challenges in meeting diverse learners' needs. The inconsistent level of preservice teachers' exposure to DI implemented with fidelity in teacher education programs served as the catalyst for the study (Santangelo & Tomlinson, 2012). The original instrument has been modified, with permission, for other studies (Ginja & Chen, 2020; Knight, 2016). The instrument was implemented on a limited basis (Ginja & Chen, 2020; Ramli

& Yusoff, 2020; Santangelo & Tomlinson, 2012). The current study sought to extend the instrument's use to examine DI perceptions and implementation among educators across grade levels and subject areas. Santangelo and Tomlinson (2012) established the survey's validity through piloting and by grounding the content in Tomlinson's differentiation model (Tomlinson, 2014). The construct of readiness reflects the learners' educational background, perceptions of the academic world, as well as their academic ability (Santangelo & Tomlinson, 2012). The research modified the wording of the instrument to reflect the K12 classroom setting. Dr. Santangelo approved modifications and implementation of the survey (see Appendix H). The changes, as noted in bold in Appendix H, involved substituting the word study for candidates and class for course and removing the words "office hours". The form and intent of the survey statements remained intact. The proposed changes and the implemented version of the survey are in Appendix H. The construct of learner interest reflects topics and areas that pique learners' curiosity. Learner profile encompasses the preferred means of attaining knowledge. The constructs of readiness, interest, and learner profile guide teachers' differentiation of the content, process, product, and learning environment. The content reflects the idea or concept taught. The process reflects the activities utilized to prompt the learning. Flexible grouping is a major component of the process construct. The product represents the summative assessment allowing learners to exhibit their level of mastery of the content. Finally, the environment encompasses the positive atmosphere established to support and facilitate learning (Santangelo & Tomlinson, 2012). The instrument measures teachers' perspectives of the DI constructs and the importance of recognizing and responding to learner variances by frequently implementing DI practices. The instrument has 70 questions divided among three sections. Part I collected demographic data and the researcher adapted the questions to reflect the needs of the current study.

Part I, contains 10 questions and collects demographic data of specific interest to the current study. The instrument's Parts II and III contain 60 questions to assess the constructs of teachers' perception of DI and teachers' frequency of implementation of DI practices (Santangelo & Tomlinson, 2012). Part II, comprised of 21 questions, assessed teachers' perception of DI disaggregated by learners' characteristics, including interests and profiles. Learners' characteristics include their readiness level, culture, preferred intelligence, and gender (Tomlinson, 2017). The instrument also measured teachers' view of the importance of variance among the learners. Part III, comprised of 39 questions, assessed the frequency of teachers' differentiation (Santangelo & Tomlinson, 2012). Part III included differentiation of the environment, content, process, and product. The differentiation implementation construct measures how often teachers modify the material, how the material is delivered, and how learners display their understanding (Tomlinson, 2017). The instrument utilized a 5-point Likert-type scale for Parts II and III with strongly disagree, disagree, unsure, agree, and strongly agree offered as answer choices for Part II and never—no intention to do so in the future, never—may be willing to do so in the future, occasionally, frequently, or always for Part III (Santangelo & Tomlinson, 2012). The total score for Parts II and III ranged from 21 to 105 and 39 to 195, respectively (Santangelo & Tomlinson, 2012). The total possible score for the instrument ranged from 60 to 300. The current study used the composite scores for Part II and Part III. The scores in Part II that approached 105 indicated the educator recognized the importance of learner differences across their identified interests, readiness level, and learning profile. The scores approaching 195 in Part III indicated that the educator frequently implemented DI practices in the classroom (Santangelo & Tomlinson, 2012). The researchers did not include specific instructions on administration procedures for their instrument with the exception that due to the

exploratory nature of the study, Part II did not utilize a forced response (Santangelo & Tomlinson, 2012). For the purposes of this study, instructions similar to those used by Tschannen-Moran and Hoy (2001) for the *TSES* were used. See Appendix H for the instructions. The instrument took approximately 28 minutes to complete. The researcher scored the instrument and validated the scores using a spreadsheet and calculator. The Cronbach's alpha coefficient ($\alpha$) of the instrument's reliability was .91 (Santangelo & Tomlinson, 2012). Parts II and III were $\alpha = .86$ and $\alpha = .93$, respectively. The reliability coefficients exceeded .80, which is indicative of a reliable instrument (Gall et al., 2007). See Appendix H for permission to use the instrument in the current study.

The *TSES* (Tschannen-Moran & Hoy, 2001) and *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) instruments were combined to accommodate for the participants' time but assessed separately by Qualtrics and scored and validated by the researcher. The composite score of the *TSES* and composite scores from Part II and Part III of the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) instrument were used to test the three hypotheses. The survey, in its entirety, took approximately 35 to 40 minutes to complete.

## Procedures

The researcher completed the Institutional Review Board (IRB) certification training and included a copy of the certificate in Appendix A. The researcher also secured IRB approval (see Appendix B) before collecting data. The researcher contacted several South Carolina school districts who offer gifted programming and serve a student population originating from under-resourced homes. Four districts granted the researcher permission to conduct the study in their respective districts. The four school districts of varying size served as the target population. School District 1 (SD 1), School District 2 (SD 2), School District 3 (SD 3), and School District

4 (SD 4) student populations experienced poverty at 69.3%, 66.30% and 72.0%, and 65.8% respectively (SCDE, 2021a, 2021c). Students of color comprised 38.28%, 50.77%, 27.25%, and 64.37% of the total population of SD 1, SD 2, SD 3, and SD 4 respectively (SD1, n.d.; SCDE, 2021a). The researcher collected the school demographic data from the SCDE website and school districts web sites (SD1, n.d.; SD3, 2021; SCDE, 2021a, 2021c). The researcher contacted the superintendents of SD 1 and SD 3, and assistant superintendents for SD 2 and SD 4 and explained the study's purpose and the data collection procedures.

The initial contact set the tone and the researcher continued to foster a positive environment for the study through personal contact via email (Gall et al., 2007). The researcher emailed a brief overview of the study requesting to conduct the research to each superintendent and district representative. The superintendents, assistant superintendent, and district representatives read the brief overview, and provided an electronic response returned to the researcher via email (Appendix C). SD 3's superintendent, SD 1's emissary, SD 2's assistant superintendent, and SD 4's director of assessment and evaluation served as the representatives and points of contact. Having received permission from SD 1 and SD 3, the researcher contacted SD 3's curriculum and instruction superintendent and the building principals for SD 1 and SD 3. SD 3's curriculum specialist previewed the request sent to the principals. The contact with the district representatives was digital (via email) unless requested otherwise. SD 1 requested a phone call to discuss the specifics of the study. The researcher contacted SD 2's assistant superintendent and SD 4's director of assessment and evaluation via email. The researcher did not contact the building principals of SD 2 and SD 3. The representatives for SD 2 contacted the district's principals and SD 4's representative disseminated the survey to the certified staff. The researcher's contact with the stakeholders set a positive tone and initiated two-way dialogue.

Appendix C contains the permission request letters and signed approval letters and emails. The plan in Appendix D describes the communication established to build and maintain a positive rapport with the sites (Gall et al., 2007).

The researcher sent the recruitment email and survey link during the first semester for each district (SD1, n.d.; SD2, n.d.; SD3, 2021; SD4, n.d.). The researcher sent the recruitment email with the embedded link for the online survey (see Appendices E and F) to the district representatives. The emails were forwarded through SD 1's emissary, SD 2's assistant superintendent, SD 3's IT department, and SD 4's director of assessment and evaluation. The researcher sent a follow-up email approximately one to two weeks after the initial link was sent to all districts except SD 4 (see Appendix E for the follow-up email). The email served to maintain an open line of communication and positive rapport with the participants (Gall et al., 2007). It also served as a reminder to complete the survey. As the survey did not collect identifying data, the entire target population received the follow-up email.

The researcher combined the instruments into survey and link for ease of completion by the volunteers (Warner, 2013). The researcher digitized the surveys using the online platform Qualtrics. The researcher grouped the questions for the *TPUDIP* survey (Knight, 2016; Santangelo & Tomlinson, 2012) according to the constructs learner characteristics, readiness, interests, learning profile, learning environment, content, process and product, and assessment. The questions for each construct appeared on one page. The researcher grouped the questions for the *TSES* (Tschannen-Moran & Hoy, 2001) survey according to the constructs efficacy for instructional strategies, efficacy for classroom management, and efficacy for student engagement. The questions for each construct appeared on one page. Qualtrics administered the survey.

The volunteer opened the email and read the message regarding the purpose of the study. The volunteer clicked on the link included in the message, redirecting them to Qualtrics and the digitized instruments. The volunteer reviewed a consent form and explanation of the study (see Appendix I). If the volunteer agreed to participate in the study, he or she clicked "next" to proceed to the demographic data collection form. The participants provided their demographic data by reading each statement and clicking on the box that best represents their descriptive information. To proceed to the first survey, the participant clicked "next." The first survey was the *TPUDIP* survey (Knight, 2016; Santangelo & Tomlinson, 2012). The participant read a brief note regarding the Likert-type scale and instructions and then began to answer the questions. To choose an answer, the participants clicked on the box corresponding to their answer choice—strongly disagree, disagree, unsure, agree, or strongly agree for Part II (Santangelo & Tomlinson, 2012). For Part III, to choose an answer, the participants clicked on the box corresponding to their answer choice—never—no intention to do so in the future, never—may be willing to do so in the future, occasionally, frequently, or always (Santangelo & Tomlinson, 2012). After the *TPUDIP* survey (Knight, 2016; Santangelo & Tomlinson, 2012), the participants clicked "next" to proceed to the *TSES* (Tschannen-Moran & Hoy, 2001). The participants read an instructional statement provided as part of the TSES and then began the survey. The participants read each question and then clicked in the box beside the answer choice that best reflected their answer. The answer choices ranged from one through nine with the anchors—1= not at all, 3=very little, 5=some degree, 7=quite a bit, and 9=a great deal (Tschannen-Moran & Hoy, 2001). At the end of the survey, the participants clicked "next." The final screen contained a thank you note to inform the participants of the conclusion of their participation and reminded them that no further action is required unless they wish to enter their email address for a chance to win one of six $25

e-gift cards. The final screen included a link taking the participants to a form to collect their email addresses. The email addresses provided were entered into a random drawing. The email addresses were downloaded into a spreadsheet and numbered for the raffle. Six numbers were drawn and the corresponding email addresses received a notification email and e-gift card. The email address collection was not connected to the collected survey data to insure participant anonymity. See Appendix C for the districts' approval for the inclusion of the incentive. Lastly, the participant closed his or her browser ending the survey session. At the conclusion of the data collection period, the researcher downloaded the collected data from the host site to a spreadsheet and into SPSS for data analysis. The researcher stored the data on a password-protected computer and on a password-protected external hard drive accessible only to the researcher (Gall et al., 2007). All emails, digitally collected data, and electronic communication documents were stored on the password-protected computer and backed up on the external hard drive. Lastly the researcher stored hard copies of collected data in a locked locker accessible only to the researcher.

## Data Analysis

The study's data analysis applied bivariate linear regression to examine the relationship between gifted endorsement and teachers' self-efficacy, gifted endorsement and teachers' perceptions of DI, and gifted endorsement and teachers' frequency of implementation of DI practices (Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001; Warner, 2013). The first bivariate linear regression included gifted endorsement and teachers' self-efficacy as the predictor and criterion variables, respectively (Tschannen-Moran & Hoy, 2001; Warner, 2013). The second bivariate regression used gifted endorsement and teachers' perspectives of DI practices as the predictor and criterion variables, respectively (Santangelo & Tomlinson, 2012;

Warner, 2013). A third bivariate linear regression used gifted endorsement and teachers' frequency of implementation of DI practices as the predictor and criterion variables, respectively (Santangelo & Tomlinson, 2012; Warner, 2013).

The study included one categorical predictor variable, gifted endorsement, and three quantitative criterion variables, teachers' self-efficacy, teachers' perceptions of DI, and teachers' frequency of implementation of DI practices (Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001; Warner, 2013). Although the study's bivariate correlational design allowed for several statistical options, bivariate linear regression was the best option because the study sought to examine the predictive relationship between the predictor variable gifted endorsement and the criterion variables teachers' sense of self-efficacy, teachers' perceptions of DI, and teachers' frequency of implementation of DI practices (Green & Salkind, 2017; Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001; Warner, 2013). Dixon et al. (2014) used ANOVAs and regression to examine the relationship between self-efficacy, teacher grade level, subject area, professional development, and DI practice. Because the current study examined the relationship between similar variables, three bivariate linear regressions assessed the possible predictive relationship between the predictor variable gifted endorsement and the criterion variables teachers' self-efficacy, teachers' perceptions of DI, and teachers' frequent implementation of DI practices, respectively (Dixon et al., 2014; Warner, 2013).

Bivariate linear regression calculates the strength and direction of the relationship between two variables and demonstrates the percentage of variance in teachers' self-efficacy, teachers' perceptions of DI, and teachers' frequency of implementation of DI practices explained by gifted endorsement using the coefficient of determination ($r^2$) value (Green & Salkind, 2017; Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001; Warner, 2013). Bivariate

regression takes the correlation to a more robust level by considering the strength of the predictive relationship and linear correlation using an equation for the line of best fit to mathematically and visually represent the regression model (Rockinson-Szapkiw, 2013b; Warner, 2013). The researcher calculated estimates for the slope ($b$) and intercept ($b_0$) from the linear equation $Y' = b_0 + bX$,, where $Y'$ is the predicted score as a linear function of $X$ (Warner, 2013). The slope ($b$) and intercept ($b_0$) are calculated using the sum of the squared differences between the predicted and actual $Y$ scores. (Warner, 2013). The regression line, or line of best fit, represents a minimization of the distance between the actual and predicted scores (Rockinson-Szapkiw, 2013b). Therefore, for this study's purpose, a bivariate linear regression analysis represented the best fit for statistical analysis to test the hypotheses. Although the data analyses may reveal a strong correlation between the two variables, a correlational relationship in a non-experimental study does not indicate causation (Warner, 2013).

The researcher employed bivariate linear regression to compare the strength of the correlation and predictive nature of gifted endorsement on *TSES* and *TPUDIP* scores across two groups delineated according to gifted endorsement—GTT and NGTT (Knight, 2016; Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001; Warner, 2013). Because the study's analyses included three bivariate linear regressions, the analyses also included the Bonferroni correction procedure for each regression to reduce the risk of Type I error (Rockinson-Szapkiw, 2013a; Warner, 2013). To accommodate for the conservative nature of the Bonferroni procedure, the experiment wise alpha ($EW_\alpha$) was set to .0167 (Warner, 2013). The per-comparison alpha was $PC_\alpha = EW_\alpha/k$, where (k = 3), and the $PC_\alpha = .0167$ for the three procedures.

The researcher downloaded the online survey data from the host website into a spreadsheet and entered the calculated scores and verified data into SPSS (Green & Salkind,

2017; Warner, 2013). The researcher scanned the data for missing entries and inconsistencies and checked the instrument scores for correct calculations (Green & Salkind, 2017; Warner, 2013). The calculations only included participants with scores on both instruments (Warner, 2013). The researcher employed the force response option for all survey questions.

The bivariate linear regression analyses included three criterion variables, participants' scores on *TSES* (Tschannen-Moran & Hoy, 2001), participants' perception scores on *TPUDIP*, and participants' frequency of use scores on *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012), and one dichotomous predictor variable with two possible values, GTT coded 0, and NGTT teachers coded 1 (Warner, 2013). Group assignments of teachers with gifted endorsement and teachers without gifted endorsement do not involve a selected cut-off score such as a pass versus fail group membership (Warner, 2013). The teachers take ascribed coursework, and the SCDE (2021b) updates the certificate to include the gifted endorsement. Three bivariate linear regression analyses were conducted to test the hypotheses and determine if there is a predictive relationship between the predictor variable gifted endorsement (GTT and NGTT) and the criterion variables participants' scores on the *TSES*, participants' perceptions of DI scores on the *TPUDIP*, and participants' frequency of DI implementation scores on the *TPUDIP* as noted on the respective instruments (Knight, 2016; Santangelo & Tomlinson, 2012; Tschannen-Moran & Hoy, 2001; Warner, 2013).

Participating teachers assigned to K4 through grade 12 self-reported their gifted endorsement, and the online web host, Qualtrics, recorded participant responses. The researcher calculated the scores for the *TSES* (Tschannen-Moran & Hoy, 2001) and *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) instruments. The researcher also checked the calculations for accuracy using spreadsheets and a calculator. Gifted endorsement was denoted as a 0 for teachers

with gifted endorsement and a 1 for teachers without gifted endorsement (Warner, 2013). The *TSES* scores ranged from 12 to 108, with scores approaching 108 indicating that teachers were efficacious (Tschannen-Moran & Hoy, 2001). Part II scores of the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) ranged from 21 to 105 with scores approaching 105 indicating a positive perception of DI and the importance of recognizing learner variance. Part III scores of the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) ranged from 39 to 195 with scores approaching 195 indicating frequent implementation of DI practices. The *TPUDIP* composite scores ranged from 60 to 300, with scores approaching 300 indicating that teachers' perceptions of DI were positive and their implementation was frequent (Knight, 2016; Santangelo & Tomlinson, 2012). The descriptive data for the *TSES* (Tschannen-Moran & Hoy, 2001) and *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) for each group was analyzed (Warner, 2013). SPSS was utilized to analyze each instrument's descriptive data and include mean scores and standard deviations (Green & Salkind, 2017; Warner, 2013). Three bivariate linear regressions were conducted to tests the hypotheses.

The first hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' sense of self-efficacy as measured by the *Teachers' Sense of Efficacy Scale* (Tschannen-Moran & Hoy, 2001) and the predictor variable gifted endorsement. Assumptions for a bivariate linear regression were checked (Warner, 2013). First, descriptive statistics were obtained for the criterion variable teachers' sense of self-efficacy as measured by the *TSES* (Tschannen-Moran & Hoy, 2001) for each group (Warner, 2013). The sample contained 108 members divided between the two groups according to gifted endorsement status—38 with gifted endorsement and 70 without gifted endorsement. The *TSES* scores range from 12 to 108—scores approaching 108 indicate high teacher self-efficacy (Tschannen-Moran

& Hoy, 2001). The dichotomous predictor variable was denoted with a 0 for GTT or 1 for NGTT (Warner, 2013).

The researcher screened the data to identify any inconsistencies (Warner, 2013). Inconsistencies included unlikely scores and missing data. The data were screened for inconsistencies and missing data points or scores. Assumptions for a bivariate linear regression were checked (Warner, 2013). A boxplot was used to check the assumption of bivariate outliers between the predictor variable gifted endorsement (x) and the criterion variable teachers' sense of self-efficacy (y). Extreme outliers are extreme scores or data points that may unduly influence the calculations (Warner, 2013). A scatterplot was utilized to check the assumption of linearity between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' sense of self-efficacy (Rockinson-Szapkiw, 2013a; Warner, 2013). The data points should display a linear pattern without curvature (Warner, 2013). A histogram was utilized to check for bivariate normal distribution between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' sense of self-efficacy (Warner, 2013). The scores should display a bell-shaped curve. The descriptive statistics are displayed in a table in the results section. A bivariate linear regression was conducted in SPSS to evaluate the relationship between gifted endorsement and teachers' sense of self-efficacy as measured by the *Teachers' Sense of Efficacy Scale* (Green & Salkind, 2017; Tschannen-Moran & Hoy, 2001; Warner, 2013).

The second hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' perspective of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* (Knight, 2016; Santangelo & Tomlinson, 2012) and the predictor variable gifted endorsement. Assumptions for a bivariate linear regression were checked (Warner, 2013). First, descriptive

statistics were obtained for the criterion variable as measured by the *TPUDIP* instrument (Knight, 2016; Santangelo & Tomlinson, 2012) for each group. The sample contained 108 teachers divided between the two groups according to gifted endorsement status—38 with gifted endorsement and 70 without gifted endorsement. The scores for the *TPUDIP* survey ranged from 29 to 105, with a high score of 105 indicating that teachers perceive the inclusion of the DI tenets of students' readiness, interests, and learning profile as important and impactful to instruction and learning (Knight, 2016; Santangelo & Tomlinson, 2012). A low score of 29 indicates that teachers do not view the inclusion of the DI tenets as important and impactful to instruction and learning (Santangelo & Tomlinson, 2012). The predictor variable was denoted with a 0 for GTT or 1 for NGTT (Warner, 2013).

The researcher screened the data to identify any inconsistencies (Warner, 2013). Inconsistencies included unlikely scores and missing data. The data were screened for inconsistencies and missing data points or scores. Assumptions for a bivariate linear regression were checked (Warner, 2013). A boxplot was used to check the assumption of bivariate outliers between the predictor variable gifted endorsement (x) and the criterion variable teachers' perspective of differentiated instructional practices (y). Extreme outliers are extreme scores or data points that may unduly influence the calculations. A scatterplot was utilized to check the assumption of linearity between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' perspective of differentiated instructional practices (Rockinson-Szapkiw, 2013a; Warner, 2013). The data points should display a linear pattern without curvature (Warner, 2013). A histogram was utilized to check for bivariate normal distribution between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' perspective of differentiated instructional practices (Warner, 2013). The scores should display a bell-shaped

curve (Warner, 2013). The descriptive statistics are displayed in a table in the results section. A bivariate linear regression was conducted in SPSS to evaluate the relationship between gifted endorsement and teachers' perceptions of differentiated instructional practices as measured by the *TPUDIP* survey (Green & Salkind, 2017; Knight, 2016; Santangelo & Tomlinson, 2012; Warner, 2013).

The third hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' frequency of implementation of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* (Knight, 2016; Santangelo & Tomlinson, 2012) and the predictor variable gifted endorsement. Assumptions for a bivariate linear regression were checked (Warner, 2013). First, descriptive statistics were obtained for the criterion variable as measured by the *TPUDIP* instrument (Knight, 2016; Santangelo & Tomlinson, 2012) for each group. The sample contained 108 teachers divided between the two groups according to gifted endorsement status—38 with gifted endorsement and 70 without gifted endorsement. The scores for the *TPUDIP* survey measuring the construct of frequency of implementation ranged from 39 to 195, with scores approaching 195 indicating that teachers frequently implement DI practices (Knight, 2016; Santangelo & Tomlinson, 2012). The predictor variable was denoted with a 0 for GTT or 1 for NGTT (Warner, 2013).

The researcher screened the data to identify any inconsistencies (Warner, 2013). Inconsistencies included unlikely scores and missing data. The data were screened for inconsistencies and missing data points or scores. Assumptions for a bivariate linear regression were checked (Warner, 2013). A boxplot was used to check the assumption of bivariate outliers between the predictor variable gifted endorsement (x) and the criterion variable teachers'

frequency of implementation of differentiated instructional practices (y). Extreme outliers are extreme scores or data points that may unduly influence the calculations. A scatterplot was utilized to check the assumption of linearity between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' frequency of implementation of differentiated instructional practices (Rockinson-Szapkiw, 2013a; Warner, 2013). The data points should display a linear pattern without curvature (Warner, 2013). A histogram was utilized to check for bivariate normal distribution between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' frequency of implementation of differentiated instructional practices (Warner, 2013). The scores should display a bell-shaped curve. The descriptive statistics are displayed in a table in the results section. A bivariate linear regression was conducted in SPSS to evaluate the relationship between gifted endorsement and teachers' frequency of implementation of DI practices as measured by the *TPUDIP* survey (Green & Salkind, 2017; Knight, 2016; Santangelo & Tomlinson, 2012; Warner, 2013).

SPSS reports several statistics that evaluate the strength of a bivariate correlation when conducting a linear regression (Green & Salkind, 2017). If the correlation is significant at the 95% confidence interval where $p < .05$, the null will be rejected (Warner, 2013). The Pearson's product-moment coefficient ($r$) also determines the strength of the correlation (Warner, 2013). The scores range from -1 to +1, with a score of 1 indicating a perfect correlation. The sign of the coefficient determines the direction of the correlation. The coefficient of determination ($r^2$) provides information on the amount of predictable outcome variance according to group assignment (Warner, 2013). In other words, how accurately the predictor variable predicts the scores for the criterion variable (Green & Salkind, 2017). The product of determination ($r^2$) expresses the effect size as small when $r^2 = .000 - .010$, medium when $r^2 = .022 - .059$, large

when $r^2$ = .083 - .138, very large when $r^2$ = .168 - .360, and extremely large when $r^2$ = .500 (Warner, 2013, p. 208). The *F* ratio reported in the ANOVA measures the statistical significance of the regression (Warner, 2013). If the *F* ratio calculated using the degrees of freedom (*df*) for the sum of squares (SS) terms exceeds the critical value (Warner, 2013, pp. 1058-1061), the researcher rejects the null because the regression is statistically significant. The descriptive statistics, scatterplot, box and whisker, assumption test results, regression equation, degrees of freedom, Pearson's product-moment coefficient (*r)*, $r^2$ for the effect size, *F* ratio, and beta coefficients are reported and displayed using tables and figures in the results section for each regression (Green & Salkind, 2017; Rockinson-Szapkiw, 2013a). Due to the Bonferroni correction, the per-comparison alpha level was set at $\alpha$ = .0167 for the three procedures. The results are discussed in the next chapter.

# CHAPTER FOUR: FINDINGS

## Overview

This quantitative, non-experimental, correlational study sought to determine if a predictive relationship existed between teachers' self-efficacy, their perception of differentiated instruction (DI) strategies, the frequency of inclusion of DI strategies in their practice, and gifted endorsement. The predictor variable was teachers' gifted endorsement, and participants self-reported their endorsement status. Teachers' sense of self-efficacy, their perception of DI strategies, and their frequency of implementation of DI strategies served as the criterion variables. Three bivariate linear regressions were conducted to test the hypotheses. The analyses included a Bonferroni correction procedure to reduce the risk of Type I errors. The chapter addresses the research questions, corresponding null hypotheses, provides the descriptive statistics, and discusses the study's results.

## Research Questions

**RQ1:** Can gifted endorsement predict the level of teachers' sense self-efficacy as measured by *Teachers' Sense of Efficacy Scale* among teachers in schools that offer gifted programming?

**RQ2**: Can gifted endorsement predict teachers' perspective of differentiated instructional practices as measured by *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?

**RQ3**: Can gifted endorsement predict teachers' frequency of implementation of differentiated instructional practices as measured by *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?

## Hypotheses

**$H_{01}$:** There is no significant predictive relationship between the criterion variable teachers' sense of self-efficacy as measured by the *Teachers' Sense of Efficacy Scale* and the predictor variable gifted endorsement.

**$H_{02}$:** There is no significant predictive relationship between the criterion variable teachers' perspective of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* and the predictor variable gifted endorsement.

**$H_{03}$:** There is no significant predictive relationship between the criterion variable teachers' frequency of implementation of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* and the predictor variable gifted endorsement.

## Descriptive Statistics

The study's sample consisted of 108 teachers. Tables 2 through 4 display the sample's demographic data. Qualtrics, the survey's webhost, recorded 164 responses with 108 fully complete. The sample included the 108 volunteers who completed the surveys. The volunteers' grade level placement extended across grade levels k4-12. The majority (62.92%) of the respondents taught grades 1-6 with 34.68% of the volunteers teaching grades 6-8 and 28.23% of the volunteers teaching grades 1-5. Three research questions guided the study and subsequent data analyses. Tables 5, 6, and 7 display the descriptive statistics of each research question. The tables include the mean and standard deviation for each criterion variable.

**Table 5**

***RQ 1 Descriptive Statistics***

| | Mean | Std. Deviation | N |
|---|---|---|---|
| TSES Total Score | 86.13 | 11.942 | 108 |

**Table 6**

***RQ 2 Descriptive Statistics***

| | Mean | Std. Deviation | N |
|---|---|---|---|
| DI Perception Total Score | 84.32 | 12.783 | 108 |

**Table 7**

***RQ 3Descriptive Statistics***

| | Mean | Std. Deviation | N |
|---|---|---|---|
| DI Frequency of Implementation Total Score | 152.63 | 22.066 | 108 |

## Results

### Null Hypothesis One

The first null hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' sense of self-efficacy as measured by the *Teachers' Sense of Efficacy Scale* (TSES) (Tschannen-Moran & Hoy, 2001) and the predictor variable gifted endorsement. A bivariate linear regression with Bonferroni correction procedure was applied to the data to test the null hypothesis.

#### *Data Screening*

The researcher scanned the collected data for inconsistencies. The score ranges for the variable teachers' sense of self-efficacy as measured by the *TSES* (Tschannen-Moran & Hoy, 2001) were 12 to 108. Each construct's score ranged from 4 to 36, with a total score of 12 to 108 for the instrument. The researcher checked the scores to ensure the calculated scores fit within the acceptable ranges. The survey employed force response which ensured the participant answered each question before proceeding to the next page of questions. The researcher also

scanned the collected data for missing scores. The sample included 108 completed TSES surveys with 38 respondents holding a gifted endorsement. The dichotomous predictor variable was coded as 0 or 1 using the SPSS option to transform and recode the existing yes/no variable to a new numerical variable. A 0 indicated gifted endorsement teachers (GTT) and a 1 indicated teachers without gifted endorsement (NGTT). No inconsistencies were identified.

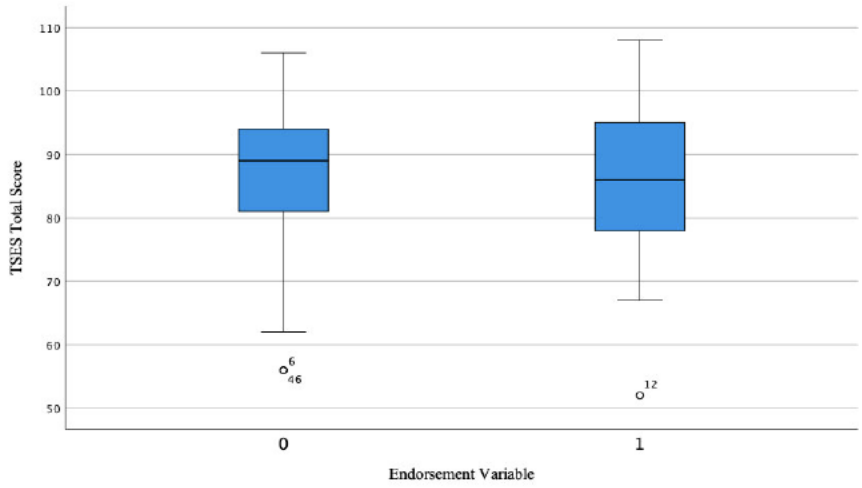
### *Assumption Tests*

**Assumption of Linearity**. A scatterplot was utilized to check the assumption of linearity between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' sense of self-efficacy (Rockinson-Szapkiw, 2013a; Warner, 2013). The scores displayed a linear pattern without curvature (Warner, 2013).

**Bivariate Outliers**. The researcher visually checked the boxplot of the data to identify extreme outliers because the extreme scores may influence the analysis (Warner, 2013). A boxplot was used to check for bivariate extreme outliers between the predictor variable gifted endorsement (x) and the criterion variable teachers' sense of self-efficacy (y). The boxplot revealed no extreme outliers and all data points fit within the acceptable score range. See Figure 2 for the boxplot.

**Figure 2**

***Boxplot of TSES Scores and Endorsement***

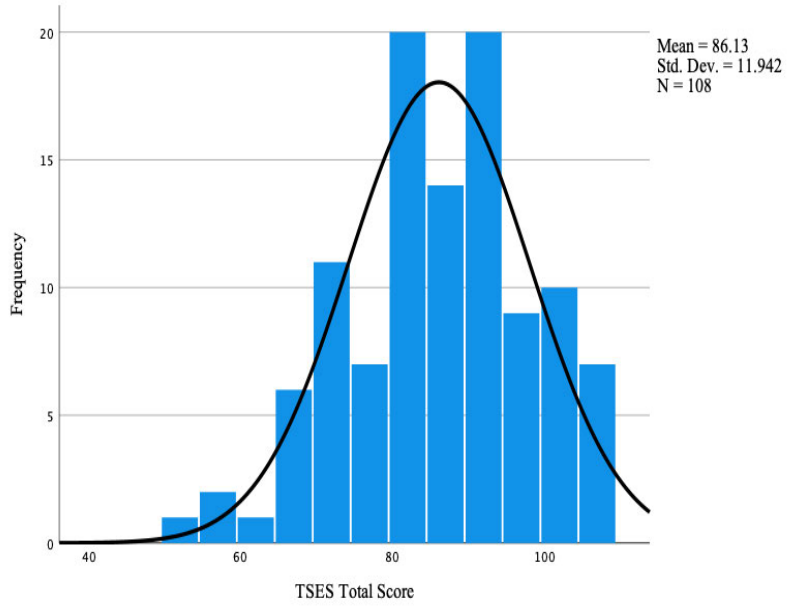



*Note*: The boxplot displays the *TSES* (Tschannen-Moran & Hoy, 2001) scores grouped according to gifted endorsement status.

**Assumption of Bivariate Normal Distribution**. Lastly, a histogram with imposed normal curve was utilized to check for bivariate normal distribution between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' sense of self-efficacy (Warner, 2013). The scores displayed an approximately normal bell-shaped curve indicating normal distribution of the data (Warner, 2013). See Figure 3 for the histogram.

**Figure 3**

***Histogram of TSES Scores***




*Note*: The histogram displays the *TSES* (Tschannen-Moran & Hoy, 2001) scores.

***Results of Bivariate Linear Regression***

A bivariate linear regression was applied to the data to assess the first null hypothesis and determine if a predictive relationship existed between teachers' sense of self-efficacy and gifted endorsement. The first null hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' sense of self-efficacy as measured by the *Teachers' Sense of Efficacy Scale* (*TSES*) (Tschannen-Moran & Hoy, 2001) and the predictor variable gifted endorsement. Given the study's sample size, 108, and assuming a medium effect size at the statistical power level of .7 set the alpha at .05 (Gall et al., 2007). However, the inclusion of three null hypotheses necessitated the use of the Bonferroni correction procedure to reduce the likelihood of committing a Type I error (Rockinson-Szapkiw, 2013a; Warner, 2013). The Bonferroni adjusted per-comparison alpha level was set at $\alpha = .0167$ for the three procedures where $\alpha = .05/3 = .0167$. The Pearson's product-momentum coefficient indicated weak and negative correlation (Warner, 2013). The correlation coefficients are displayed in Table 9. The

regression equation predicting teacher's sense of self-efficacy based on gifted endorsement was $TSES_{Gifted\ Endorsed}$ = 86.658 - -.815 * 0 and $TSES_{Not\ Gifted\ Endorsed}$ = 86.658 - -.815 * 1. The TSES score for gifted endorsed teachers were, on average, .815 points higher than those for the teachers without gifted endorsement. The beta coefficients are displayed in Table 10. The researcher failed to reject Null Hypothesis One at the 95% confidence interval at the adjusted per-comparison $\alpha$ = .02 (.0167) where $p < .737$. Gifted endorsement did not effectively predict teachers' sense self-efficacy scores ($M$=86.13, $SD$=11.942), $F(1, 106) = .114$, $p < .737$. The coefficient of determination ($r^2$) indicated that .10% of the variance among the *TSES* (Tschannen-Moran & Hoy, 2001) scores could be predicted by gifted endorsement.

**Table 8**

***Model Summary[b]***

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .033[a] | .001 | -.008 | 11.992 |

a. Predictors: (Constant), Endorsement Variable
b. Dependent Variable: TSES Total Score

**Table 9**

***Coefficients[a]***

| | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| Model | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 86.658 | 1.945 | | 44.546 | .000 |
| | Endorsement Variable | -.815 | 2.416 | -.033 | -.337 | .737 |

**Null Hypothesis Two**

The second null hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' perspective of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey (TPUDIP)* (Knight, 2016; Santangelo & Tomlinson, 2012) and the predictor variable gifted endorsement.

### *Data Screening*

The researcher scanned the collected data for inconsistencies. The score ranges for the variable teachers' perception of differentiated instructional practices as measured by the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) were 29 to 105. The researcher checked the scores to ensure the calculated scores fit within the acceptable ranges. The survey employed force response which ensured the participant answered each question before proceeding to the next page of questions. The researcher also scanned the collected data for missing scores. The dichotomous predictor variable was coded as 0 or 1 using the SPSS option to transform and recode the existing yes/no variable to a new numerical variable. A 0 indicated gifted endorsement teachers (GTT) and a 1 indicated teachers without gifted endorsement (NGTT). No inconsistencies were identified.

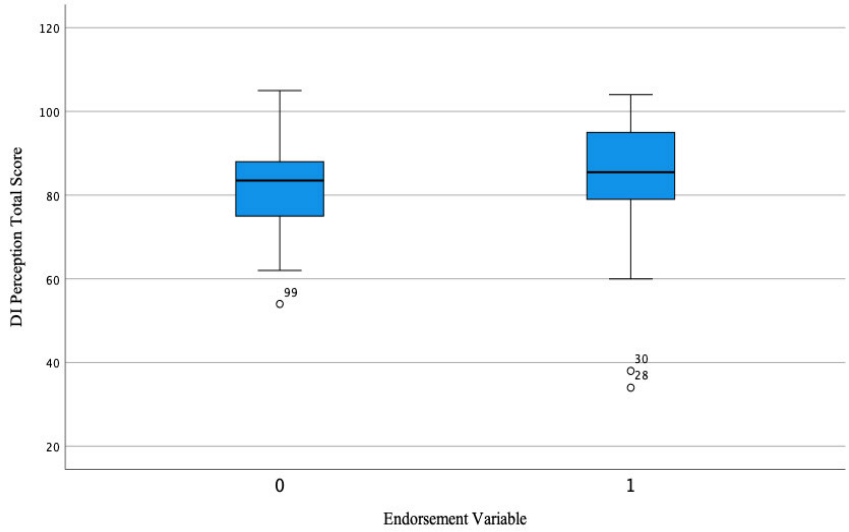
### *Assumption Tests*

**Assumption of Linearity**. A scatterplot was utilized to check the assumption of linearity between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' perception of differentiated instructional practices (Rockinson-Szapkiw, 2013a; Warner, 2013). The data points displayed a linear pattern without curvature (Warner, 2013).

**Bivariate Outliers**. The researcher visually checked a boxplot to identify extreme outliers because the extreme scores may influence the analysis (Warner, 2013). A boxplot was used to check for bivariate outliers between the predictor variable gifted endorsement (x) and the criterion variable teachers' perception of differentiated instructional practices (y). The boxplot revealed no extreme outliers and all data points fit within the acceptable score range. See Figure 4 for the boxplot.

**Figure 4**

***Boxplot of DI Perception Scores and Endorsement***

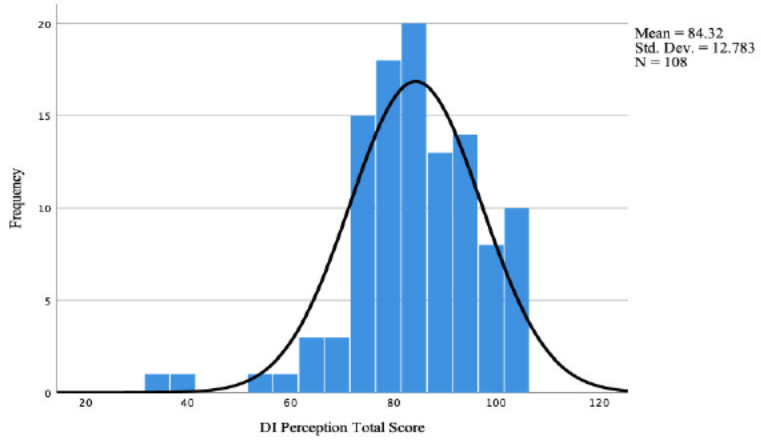



*Note*: The boxplot displays the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) DI perception scores grouped according to gifted endorsement status.

**Assumption of Bivariate Normal Distribution**. Lastly, a histogram with imposed normal curve was utilized to check for bivariate normal distribution between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' perception of differentiated instructional practices (Warner, 2013). The scores displayed an approximately normal bell-shaped curve indicating normal distribution of the data (Warner, 2013). See Figure 5 for the histogram.

**Figure 5**

***Histogram of DI Perception Scores***




*Note*: The histogram displays the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) DI perception scores.

***Results of Bivariate Linear Regression***

A bivariate linear regression was applied to the data to assess the second null hypothesis and determine if a predictive relationship existed between teachers' perception of differentiated instructional practices and gifted endorsement. The second null hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' perception of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey (TPUDIP)* (Knight, 2016; Santangelo & Tomlinson, 2012) and the predictor variable gifted endorsement. Given the study's sample size, 108, and assuming a medium effect size at the statistical power level of .7 set the alpha at .05 (Gall et al., 2007). However, the inclusion of three null hypotheses necessitated the use of the Bonferroni correction procedure to reduce the likelihood of committing a Type I error (Rockinson-Szapkiw, 2013a; Warner, 2013). The Bonferroni adjusted per-comparison alpha level was set at $\alpha = .0167$ for the three procedures where $\alpha = .05/3 = .0167$. The Pearson's product-momentum coefficient indicated a weak and positive correlation (Warner, 2013). The correlation coefficients are displayed in Table 10. The regression equation predicting teacher's perception of differentiated

instructional practices based on gifted endorsement was *TPUID* Perception Score$_{\text{Gifted Endorsed}}$ = 82.105 + (3.423 x 0) and *TPUID* Perception Score$_{\text{Not Gifted Endorsed}}$ = 82.105 + (3.423 x 1). The DI perception scores, in general, were 3.423 points higher for teachers without gifted endorsement. The beta coefficients are displayed in Table 11. The researcher failed to reject Null Hypothesis Two at the 95% confidence interval at the adjusted per-comparison $\alpha = .02$ (.0167). Gifted endorsement did not effectively predict teachers' perception of differentiated instructional practices scores ($M$=84.32, $SD$=12.783), $F(1, 106) = 1.779$, $p < .185$. The coefficient of determination ($r^2$) indicated that 1.7% of the variance among the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) DI perception scores could be predicted by gifted endorsement.

**Table 10**

***Model Summary[b]***

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .128[a] | .017 | .007 | 12.737 |

a. Predictors: (Constant), Endorsement Variable

b. Dependent Variable: DI Perception Total Score

**Table 11**

***Coefficients***

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 82.105 | 2.066 | | 39.736 | .000 |
| | Endorsement Variable | 3.423 | 2.567 | .128 | 1.334 | .185 |

**Null Hypothesis Three**

The third null hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' frequency of implementation of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated*

*Instruction Practices Survey (TPUDIP)* (Knight, 2016; Santangelo & Tomlinson, 2012) and the predictor variable gifted endorsement.

### *Data Screening*

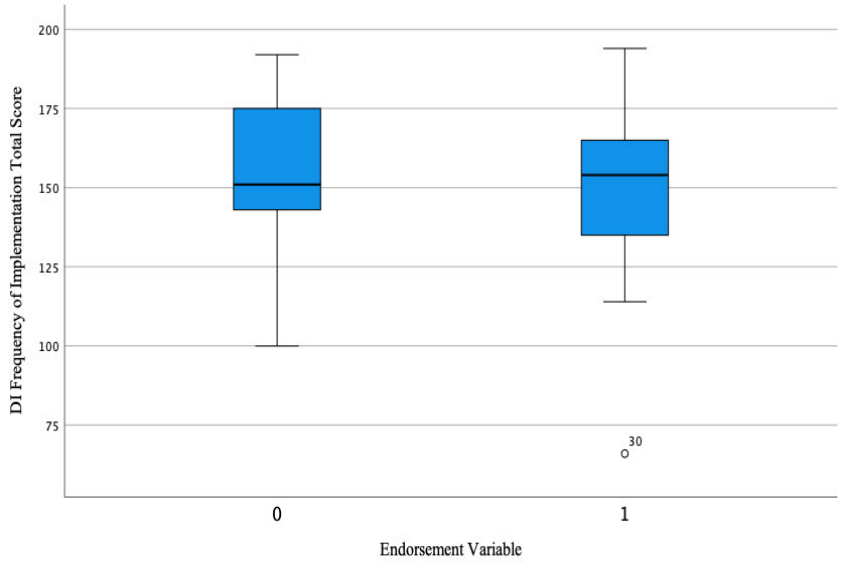
The researcher scanned the collected data for inconsistencies. The score ranges for the variable teachers' frequency of implementation of differentiated instructional practices as measured by the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) were 39 to 195. The researcher checked the scores to ensure the reported scores fit within the acceptable ranges. The survey employed force response which ensured the participant answered each question before proceeding to the next page of questions. The researcher also scanned the collected data for missing scores. The dichotomous predictor variable was coded as 0 or 1 using the SPSS option to transform and recode the existing yes/no variable to a new numerical variable. A 0 indicated gifted endorsement teachers (GTT) and a 1 indicated teachers without gifted endorsement (NGTT). No inconsistencies were identified.

### *Assumption Tests*

**Bivariate Outliers**. The researcher visually checked the boxplot to identify extreme outliers because the extreme scores may influence the analysis (Warner, 2013). A boxplot was used to check for bivariate outliers between the predictor variable gifted endorsement (x) and the criterion variable teachers' frequency of implementation of differentiated instructional practices (y). The boxplot revealed no extreme outliers. See Figure 6 for the boxplot.

**Figure 6**

***Boxplot of DI Frequency of Implementation and Endorsement***



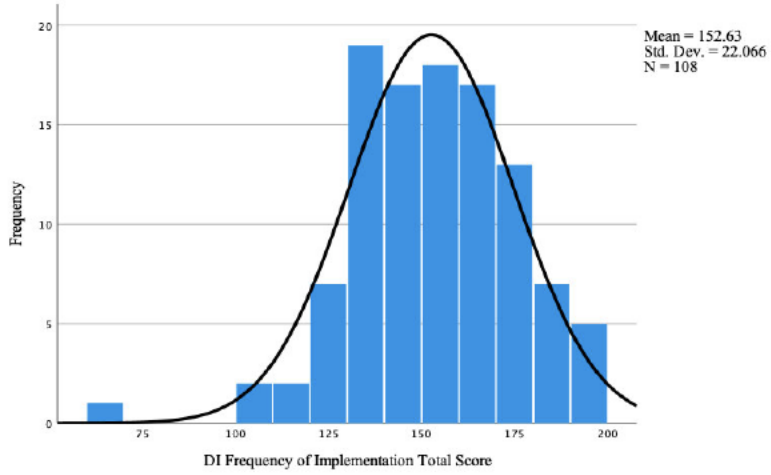

*Note*: The boxplot displays the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) DI frequency of implementation scores grouped according to gifted endorsement status.

**Assumption of Linearity**. A scatterplot was utilized to check the assumption of linearity between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' frequency of implementation of differentiated instructional practices (Rockinson-Szapkiw, 2013a; Warner, 2013). The data points displayed a linear pattern without curvature (Warner, 2013).

**Assumption of Bivariate Normal Distribution**. Lastly, a histogram with imposed normal curve was utilized to check for bivariate normal distribution between the predictor variable (x) gifted endorsement and the criterion variable (y) teachers' frequency of implementation of differentiated instructional practices (Warner, 2013). The scores displayed an approximately normal bell-shaped curve indicating normal distribution of the data (Warner, 2013). See Figure 7 for the histogram.

**Figure 7**

***Histogram of DI Frequency of Implementation Scores***




*Note*: The histogram displays the *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) DI frequency of implementation scores.

***Results of Bivariate Linear Regression***

A bivariate linear regression was applied to the data to assess the third null hypothesis and determine if a predictive relationship existed between teachers' frequency of implementation of differentiated instructional practices and gifted endorsement. The third null hypothesis stated that there is no significant predictive relationship between the criterion variable teachers' frequency of implementation of differentiated instructional practices as measured by the *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey (TPUDIP)* (Knight, 2016; Santangelo & Tomlinson, 2012) and the predictor variable gifted endorsement. Given the study's sample size of 108, and assuming a medium effect size at the statistical power level of .7 set the alpha at .05 (Gall et al., 2007). However, the inclusion of three null hypotheses necessitated the use of the Bonferroni correction procedure to reduce the likelihood of committing a Type I error (Rockinson-Szapkiw, 2013a; Warner, 2013). The Bonferroni adjusted per-comparison alpha level was set at $\alpha = .0167$ for the three procedures where $\alpha = .05/3 = .0167$. The Pearson's product-momentum coefficient indicated a weak and negative correlation

(Warner, 2013). The correlation coefficients are displayed in Table 12. The regression equation predicting teachers' frequency of implementation of differentiated instructional practices based on gifted endorsement was *TPUID* frequency of implementation$_{\text{Gifted Endorsed}}$ = 1.55.105 + (-3.820 * 0) and *TPUID* frequency of implementation$_{\text{Not Gifted Endorsed}}$ = 1.55.105 + (-3.820 * 1). The beta coefficients are displayed in Table 13. The researcher failed to reject Null Hypothesis Three at the 95% confidence interval at the adjusted per-comparison $\alpha$ = .02 (.0167). Gifted endorsement did not effectively predict teachers' frequency of implementation of differentiated instructional practices scores ($M$= 152.63, $SD$= 22.066), $F(1, 106) = .736$, $p<.393$. The coefficient of determination ($r^2$) indicated that .7% of the variance among *TPUDIP* (Knight, 2016; Santangelo & Tomlinson, 2012) teachers' frequency of implementation of differentiated instructional practices scores could be predicted by gifted endorsement.

**Table 12**

***Model Summary[b]***

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .083[a] | .007 | -.002 | 22.093 |

a. Predictors: (Constant), Endorsement Variable

b. Dependent Variable: DI Frequency of Implementation Total Score

**Table 13**

***Coefficients***

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 155.105 | 3.584 | | 43.277 | .000 |
| | Endorsement Variable | -3.820 | 4.452 | -.083 | -.858 | .393 |

# CHAPTER FIVE: CONCLUSIONS

## Overview

The concluding chapter examines the results of the quantitative, bivariate correlational study that analyzed the predictive relationship between teachers' self-efficacy, teachers' perception of differentiated instructional (DI) practices, the frequency of teachers' implementation of DI practices, and gifted endorsement. The study sought to fill the gap in the literature examining teachers' sense of self-efficacy and their perception and subsequent implementation of DI practices across multiple grade levels and certification areas. The study also sought to fill the gap in the literature comparing gifted-endorsed educators to educators without gifted endorsement. The researcher failed to reject Null Hypotheses One, failed to reject Null Hypotheses Two, and failed to reject Null Hypotheses Three. The chapter presents a discussion of the study's results, the implications of the findings, the study's limitations, and concludes with recommendations for future research.

## Discussion

The purpose of this quantitative, predictive correlational study was to determine if a relationship exists between teachers' self-efficacy, their perception and subsequent utilization of DI strategies in their practice, and gifted endorsement. The study examined the relationship utilizing three research questions. The following sections examine the study's results in light of Bandura's (1977, 1993, 1997) self-efficacy theory, Tomlinson's (2017) differentiated instruction model, and the relationship to existing literature established by previous studies.

### Research Question One

Research Question One stated, "Can gifted endorsement predict the level of teachers' self-efficacy as measured by *Teachers' Sense of Efficacy Scale* among teachers in schools that

offer gifted programming?" The researcher failed to reject the null. *TSES* (Tschannen-Moran & Hoy, 2001) scores of the gifted endorsed teachers were, on average, .815 points higher than those of the teachers without gifted endorsement. However, only .10% of the variance among the scores could be attributed to endorsement status. The mean score for each group was approximately equal, where gifted-endorsed teachers' mean score was 86.66 and teachers without gifted endorsement mean score was 85.84. The score ranges for the variable teachers' sense of self-efficacy as measured by the *TSES* (Tschannen-Moran & Hoy, 2001) were 12 to 108. The current study's findings support and contradict studies comprising the current body of literature examining the self-efficacy of in-service and preservice teachers.

Dixon et al. (2014) found a positive relationship between teachers' sense of self-efficacy and professional development focused on DI. Likewise, DeNeve et al. (2015) found a significant and positive link between professional learning communities and beginning teachers' self-efficacy. DeNeve et al.'s (2015) findings are of particular interest to the current study as self-efficacy served as a mediating factor indirectly affecting DI implementation.

The current study's findings also contradict research involving preservice teachers. Evidence indicated that training specific to meeting diverse learners' needs positively affected preservice teachers' self-efficacy (Thomas & Mucherah, 2016; Wan, 2016; Yough, 2019). Reynolds et al. (2016) also noted a strong and positive relationship between clinical training experiences facilitating mastery learning and reflective practice and preservice teachers' self-efficacy. However, the current study contradicts the prevailing findings for preservice and in-service teachers as the endorsement course requirements for South Carolina (SCDE, 2021b) did not significantly affect teachers' sense of self-efficacy. However, the findings offer partial support to Dixon et al.'s (2014) findings related to increased training hours.

The limited number of coursework hours associated with South Carolina gifted endorsement requirements (SCDE, 2021b) may reflect the need to increase the number of credit hours. The self-efficacy scores for the study's gifted-endorsed educators were slightly higher (.815) than their counterparts. The small, positive correlation may reflect Dixon et al.'s (2014) findings that increased professional development hours affect teachers' sense of self-efficacy.

**Research Question Two**

Research Question Two stated, "Can gifted endorsement predict teachers' perspective of differentiated instructional practices as measured by *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?" The researcher failed to reject the null. The DI perception scores ranged from 29-105, and scores approaching 105 indicated the educator recognized the importance of learner differences across their identified interests, readiness level, and learning profile (Santangelo & Tomlinson, 2012). The scores for the gifted-endorsed teachers in the current study were lower than those without gifted endorsement, with a mean score of 82.11 and 85.53, respectively. The findings contradict Brigandi et al.'s (2019) findings.

Brigandi et al. (2019) implemented gifted training based on Renzulli's (1976) Enrichment Triad Model. The training improved the gifted-trained teacher's perception of the importance of differentiation (Brigandi et al., 2019). The educator in the study completed graduate-level gifted education courses before participating in the study. The educator expressed a solid knowledge base and positive view of DI practices after completing the training. The current study's results also contradict Johnsen et al.'s (2020) findings. Johnsen et al. (2020) noted that more than 90% of the gifted educators in their study held a positive view of many of the best practices for gifted learners. The current study's findings indicated that coursework completed to achieve gifted

endorsement for the state of South Carolina (SCDE, 2021b) had a small yet negative effect on teachers' perspective of DI practices related to the existence of and importance of addressing learner variance.

**Research Question Three**

Research Question Three stated, "Can gifted endorsement predict teachers' frequency of implementation of differentiated instructional practices as measured by *Teachers' Perceptions and Use of Differentiated Instruction Practices Survey* among teachers in schools that offer gifted programming?" The researcher failed to reject the null. Although the frequency of implementation of differentiated instructional practices scores tended to be 3.82 points higher on average for teachers with gifted endorsement, the effect size was small. In addition, only .70% of the variance between the scores could be predicted by the teachers' endorsement status.

The slight difference observed between the DI frequency of implementation scores between teachers with gifted endorsement and teachers without gifted endorsement supports Wan's (2017) assertions. Wan found that a positive view of DI did not always translate to teachers' praxis. Similarly, Dack and Tripplett's (2020) three-year DI study found that preservice teachers' knowledge of DI did not translate to in-service implementation. The participants received instruction from Tomlinson during their teacher education training program. However, their DI implementation fluctuated and waned during their early in-service tenure. Wan (2017) and Dack and Tripplet (2020) did not delineate according to endorsement status as did the current study, but their findings reflect the importance of DI-specific training. Although gifted trained teachers presumable understand the importance of implementing DI practices, the current study did not observe a significant difference between the implementation scores between the two groups of educators. Lastly, the current study's findings also support Johnsen and Kaul's

(2019) findings.

Johnsen and Kaul (2019) found that among gifted teachers, despite 90% of the sample agreeing with the gifted best practices beliefs statements, less than one-half of those with a positive view of the practices implemented DI strategies (48% implemented ability grouping) with fidelity on a regular basis. The participants cited a need for additional training focusing on differentiated practices specific to gifted and talented students. Interestingly, the current study's findings contradict Vreys et al.'s (2018) assertions.

Vreys et al. (2018) noted that gifted training increased teachers' knowledge base and subsequent best practices implementation. Vreys et al.'s study utilized specific gifted training to facilitate gifted learner identification and serve gifted learners' needs by implementing best practices in a heterogeneous classroom setting. The participants' increased their utilization of differentiated practices as the course progressed. Vreys et al. (2018) described the implemented training as intense and one year in length. The gifted-endorsed educators in the current study completed a minimum of six credit hours focused on understanding the academic needs of gifted learners and meeting their needs with appropriate curriculum and instruction (SCDE, 2021b).

Few studies compared gifted-endorsed teachers to teachers without gifted endorsement. Hansen's and Feldhusen's (1994) findings indicated that gifted-trained teachers outperformed their counterparts without gifted training in regards to overall classroom climate and implementation of gifted education best practices. However, the current study's findings indicated that despite both groups expressing an overall positive view of DI practices, gifted-endorsed teachers reported implementing DI only slightly more often than their counterparts. The frequency of implementation scores for gifted-endorsed teachers in the current study ranged from 100 to 192 and 66 to 194 for teachers without gifted endorsement, with mean scores of

155.11 and 151.29, respectively. Although gifted-endorsed teachers implemented DI practices more frequently, the difference was not significant.

## Implications

The current study did not establish a definitive predictive relationship between gifted endorsement and teachers' perspective and subsequent implementation of DI practices among South Carolina educators. However, the findings added to the body of literature examining teachers' sense of self-efficacy and the body of literature examining the relationship between gifted endorsement and DI practices. The study expanded the demographic range to include multiple grade levels and subject areas in schools serving large populations of students originating from under-resourced homes. The study also extended the very limited body of literature comparing the DI practices and self-efficacy of gifted-endorsed educators to teachers without gifted endorsement. Lastly, the study's findings illuminated the need to examine the effectiveness of South Carolina's gifted endorsement requirements.

Self-efficacy reflects one's confidence in the ability to accomplish a task or goal and is vital to improving teachers' praxis and fostering engaging and responsive learning environments (Bandura, 1977; Reynolds et al., 2016; Suprayogi et al., 2017). However, preservice and in-service teachers do not feel efficacious about their ability to differentiate learning and may benefit from additional opportunities to engage in meaningful learning experiences (Clark, 2020; Dack, 2019a, 2019b; Reynolds et al., 2016; van Geel et al., 2019; Wan, 2016). Likewise, Vreys et al. (2018) noted the positive relationship between an intense year-long gifted training program and teachers' increased utilization of DI practices. The current study's results may indicate a need to expand the current gifted endorsement requirements to include additional hours or mastery learning opportunities.

Tomlinson's DI model utilizes a learner-centric approach to teaching employing ongoing assessments to respond to the fluid needs of the learner (Tomlinson, 2014, 2017). The positive connection between teachers' sense of self-efficacy and DI practices established by Dixon et al. (2014) and DeNeve et al. (2015); self-efficacy and adapted instruction (including differentiation) established by Poulou et al. (2019); and DI efficacy, DI beliefs, and DI practices established by Whitley et al. (2019) further underscores the importance of improving DI training for educators. The current study's finding that gifted endorsement did not significantly affect teachers' sense of self-efficacy nor their DI perception and subsequent implementation of DI strategies highlights the need to provide gifted educators with DI training. The need for effective DI training also extends to regular classroom teachers as gifted learners spend the majority of their day in a mixed-ability classroom setting (NAGC, n.d.d, 2015).

The modern classrooms' diversity proves taxing for many educators—gifted-endorsed and regular classroom teachers. Providing quality and appropriately challenging opportunities to learn for varied academic levels often proves daunting. Meeting the wide range of academic levels through the implementation of DI practices necessitates that teacher be efficacious in their ability to differentiate their curriculum and instructional strategies. Therefore, the researcher hopes the current study's findings will initiate the inclusion of additional in-depth education and professional development programs to better prepare teachers to meet the needs of all learners.

## Limitations

This study examined the possible predictive relationship between gifted endorsement and teachers' sense of self-efficacy and their differentiated instructional practices. Although the researcher exerted due diligence in planning and implementing the study, limitations exist. The study's use of a correlational design served as a limiting factor as causation cannot be

determined nor attributed to the predictor variable in a nonexperimental study (Warner, 2013). The utilization of self-reported data using digital surveys served as a study limitation. The study used a sharable and reusable link. To limit the possibility of unqualified participants completing the survey, the participating districts' representatives and IT departments disseminated the link to certified staff within their respective districts. Although the dissemination method did not eliminate the threat, it reduced the likelihood of unqualified participants' inclusion in the study.

An additional limitation is the generalizability of the findings. The study reflects teachers' practices in northwestern South Carolina in school districts offering gifted programming and serving a large number of students originating from under-resourced homes. The findings may not reflect teachers' practices in urban areas, other geographic locations such as the Northeast, Midwest, or other areas, or among schools serving a smaller percentage of students affected by poverty. Therefore, researchers should exert caution when applying these findings beyond the study's target population. The low response rate also affected the generalizability of the findings. The response rate fell below the desired 50% threshold.

The study's target population also served as a limiting factor. The small number of gifted endorsed teachers within the population required the inclusion of all of the gifted endorsed respondents. The researcher offered a chance to win one of six $25.00 gift cards to improve the response rate. However, the incentive did not appear to affect the response rate. Future researchers may choose to include larger target populations or graduate gifted education programs.

An additional limiting factor was the data collection instrument and platform. Although lengthy, the differentiated instruction survey reflected Tomlinson's (2017) model. While convenient for data collection and participant responses, electronically distributed surveys often

elicit low response rates, according to Creswell and Guetterman (2019). The combined factors of survey length and digital platform may have contributed to the low response rate.

## Recommendations for Future Research

1. The current study's findings reflect the practices of teachers in rural and suburban, small to medium-sized, public school districts serving student populations affected by poverty. Future research could examine the predictive relationship between gifted endorsement, differentiated instructional practices, and teachers' sense of self-efficacy in urban areas, private schools, and schools serving a smaller percentage of students originating from under-resourced homes.
2. Basic gifted endorsement for the state of South Carolina requires the successful completion of six prescribed credit hours from an approved college/university (SCDE, 2021b). Future studies could examine the predictive relationship between gifted endorsement, differentiated instructional practices, and teachers' sense of self-efficacy in states requiring additional coursework or certification procedures. The additional prescribed coursework or requirements could affect teachers' inclusion of differentiated instructional practices and their sense of self-efficacy.
3. The quantitative predictive study examined teachers' perceptions of their implementation of differentiated instruction and sense of self-efficacy among gifted endorsed teachers and teachers without gifted endorsement. The implementation of differentiated instructional practices was not corroborated with observations. Future research could observe the same population and employ focus groups or interviews to gain a deeper understanding of teachers' perceptions and implementation of differentiated instructional practices.

# REFERENCES

Acar, S., Sen, S., & Cayirdag, N. (2016). Consistency of the performance and nonperformance methods in gifted identification: A multilevel meta-analytic review. *Gifted Child Quarterly*, *60*(2), 81–101. https://doi.org/10.1177/0016986216634438

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *The Psychological Review, 84*(2), 191–215. https://doi.org/10.1037//0033-295X.84.2.191

Bandura, A. (1986). *Social foundations of thoughts and action: A social cognitive theory*. Prentice Hall.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117–148. https://doi.org/10.1207/s15326985ep2802_3

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman and Company.

Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science: A Journal of the American Psychological Society, 9*(3), 75-78. https://doi.org/10.1111/1467-8721.00064

Bandura, A. (2006). Guide for creating self-efficacy scales. In T. Urdan & F. Pajares (Eds.), *Self-efficacy beliefs of adolescents* (pp. 306-337). Information Age Publishing.

Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management, 38*(1), 9-44. https://doi.org/10.1177/0149206311410606

Benny, N., & Blonder, R. (2016). Factors that Promote/Inhibit teaching gifted students in a regular class: Results from a professional development program for chemistry teachers. *Education Research International, 2016*, 1-11. https://doi.org/10.1155/2016/2742905

Bernal, E. M. (2003). To no longer educate the gifted: Programming for gifted students beyond the era of inclusionism. *The Gifted Child Quarterly, 47*(3), 183-191. https://doi.org/10.1177/001698620304700302

Boelens, R., Voet, M., & De Wever, B. (2018). The design of blended learning in response to student diversity in higher education: Instructors' views and use of differentiated instruction in blended learning. *Computers & Education, 120*, 197-212. https://doi.org10.1016/j.compedu.2018.02.009

Bolland, A. C., Tomek, S. E. Besnoy, K. D., & Bolland, J. M. (2018). Gifted 'n the 'hood: Gender and giftedness as predictors of social risk among low-income students. *Exceptionality, 26*(3), 190-208. https://doi.org/10.1080/09362835.2017

Bondie, R. (2019). Demystifying differentiated instruction. *Science and Children, 57*(2), 14-19.

Bondie, R. S., Dahnke, C., & Zusho, A. (2019). How does changing "one-size-fits-all" to differentiated instruction affect teaching? *Review of Research in Education, 43*(1), 336-362. https://doi.org/10.3102/0091732X18821130

Bottia, M. C., Mickelson, R. A., Giersch, J., Stearns, E., & Moller, S. (2018). The role of high school racial composition and opportunities to learn in students' STEM college participation. *Journal of Research in Science Teaching, 55*(3), 446-476. https://doi.org/10.1002/tea.21426

Brigandi, C. B., Gilson, C. M., & Miller, M. (2019). Professional development and differentiated instruction in an elementary school pullout program: A gifted education case study. *Journal for the Education of the Gifted, 42*(4), 362-395. https://doi.org/10.1177/0162353219874418

Brown, P. C., Roediger, H. L., III, & McDaniel, M. A. (2014). *Make it stick: The science of successful learning*. The Belknap Press of Harvard University Press.

Callahan, C. M., Moon, T. R., & Oh, S. (2017). Describing the status of programs for the gifted: A Call for action. *Journal for the Education of the Gifted, 40*(1), 20-49.

Canrinus, E. T., Klette, K., & Hammerness, K. (2019). Diversity in coherence: Strengths and opportunities of three programs. *Journal of Teacher Education, 70*(3), 192-205. https://doi.org/10.1177/0022487117737305

Card, D., & Giuliano, L. (2016). Universal screening increases the representation of low-income and minority students in gifted education. *Proceedings of the National Academy of Sciences - PNAS, 113*(48), 13678-13683. https://doi.org/10.1073/pnas.1605043113

Carman, C. A., Walther, C. A. P., & Bartsch, R. A. (2018). Using the cognitive abilities test (CogAT) 7 nonverbal battery to identify the gifted/talented: An investigation of demographic effects and norming plans. *Gifted Child Quarterly, 62*(2), 193-209. https://doi.org/10.1177/0016986217752097

Chandra Handa, M. (2019). Leading differentiated learning for the gifted. *Roeper Review, 41*(2), 102-118. https://doi/10.1080/02783193.2019.1585213

Chandra Handa, M. (2020). Examining students' and teachers' perceptions of differentiated practices, student engagement, and teacher qualities. *Journal of Advanced Academics, 31*(4), 530-568. https://doi.org/10.1177/1932202X20931457

Clark, S. K. (2020). Examining the development of teacher self-efficacy beliefs to teach reading and to attend to issues of diversity in elementary schools. *Teacher Development, 24*(2), 127-142. https://doi.org/10.1080/13664530.2020.1725102

Claro, S., Paunesku, D., & Dweck, C. S. (2016). Growth mindset tempers the effects of poverty on academic achievement. *Proceedings of the National Academy of Sciences - PNAS, 113*(31), 8664-8668. https://doi.org/10.1073/pnas.1608207113

College Board. (2020). *AP program*. https://ap.collegeboard.org/?navId=www-ap

Corwith, S., Johnsen, S., Lee, C., Cotabish, A., Dailey, D., & Guilbault, K. (2019). 2019 pre-K-grade 12 gifted programming standards. *National Association for Gifted Children*. https://www.nagc.org/resources-publications/resources/national-standards-gifted-and-talented-education/pre-k-grade-12

Crabtree, L. M., Richardson, S. C., & Lewis, C. W. (2019). The gifted gap, STEM education, and economic immobility. *Journal of Advanced Academics, 30*(2), 203-231. https://doi.org/10.1177/1932202X19829749

Creswell, J. W., & Guetterman, T. C. (2019). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (6th edition). Pearson.

Cross, J. R., Frazier, A. D., Kim, M., & Cross, T. L. (2018). A comparison of perceptions of barriers to academic success among high-ability students from high- and low-income groups: Exposing poverty of a different kind. *Gifted Child Quarterly, 62*(1), 111-129. https://doi.org/10.1177/0016986217738050

Dack, H. (2018). Structuring teacher candidate learning about differentiated instruction through coursework. *Teaching and Teacher Education, 69*, 62-74. https://doi.org/10.1016/j.tate.2017.09.017

Dack, H. (2019a). The role of teacher preparation program coherence in supporting candidate appropriation of the pedagogical tools of differentiated instruction. *Teaching and Teacher Education, 78*, 125-140. https://doi.org/10.1016/j.tate.2018.11.011

Dack, H. (2019b). Understanding teacher candidate misconceptions and concerns about differentiated instruction. *The Teacher Educator, 54*(1), 22-45. https://doi.org/10.1080/08878730.2018.1485802

Dack, H., & Triplett, N. (2020). Novice social studies teachers' implementation of differentiation: A longitudinal multicase study. *Theory and Research in Social Education, 48*(1), 32-73. doi:10.1080/00933104.2019.1640149

Darling-Hammond, L. (2006a). Constructing 21st-century teacher education. *Journal of Teacher Education, 57*(3), 300-314. https://doi.org/10.1177/0022487105285962

Darling-Hammond, L. (2006b). *Powerful teacher education: Lessons from exemplary programs.* San Francisco, CA: Jossey-Bass.

Dee, T. S., Jacob, B. A., Hoxby, C. M., & Ladd, H. F. (2010). The impact of no child left behind on students, teachers, and schools [with comments and discussion]. *Brookings Papers on Economic Activity, 2010*(2), 149-207. https://doi.org/10.1353/eca.2010.0014

De Neve, D., Devos, G., & Tuytens, M. (2015). The importance of job resources and self-efficacy for beginning teachers' professional learning in differentiated instruction. *Teaching and Teacher Education, 47*, 30-41. https://doi.org/10.1016/j.tate.2014.12.003

Dijkstra, E. M., Walraven, A., Mooij, T., & Kirschner, P. A. (2017). Factors affecting intervention fidelity of differentiated instruction in kindergarten. *Research Papers in Education, 32*(2), 151-169. https://doi.org/10.1080/02671522.2016.1158856

Dixon, F. A., Yssel, N., McConnell, J. M., & Hardin, T. (2014). Differentiated instruction, professional development, and teacher efficacy. *Journal for the Education of the Gifted, 37*(2), 111-127. https://doi.org/10.1177/0162353214529042

Duquette, C. (2016). A study of inclusive practices. *Journal of Research in Special Educational Needs, 16*, 111-115. https://doi.org/10.1111/1471-3802.12132

Dweck, C. S. (2006). *Mindset: The new psychology of success (1st ed.).* Random House.

Dweck, C. S., & Yeager, D. S. (2019). Mindsets: A view from two eras. *Perspectives on Psychological Science, 14*(3), 481-496. https://doi.org/10.1177/1745691618804166

Education Improvement Act, SC Code of Laws §59-29-170 (1976, amended 1984).

Evans-Hellman, L. A., & Haney, R. (2017). Differentiation (DI) in Higher Education (HE): Modeling What We Teach with Pre-Service Teachers. *Journal of Higher Education Theory and Practice*, *17*(5). https://doi.org/10.33423/jhetp.v17i5.1535

Fernández, E., García, T., Arias-Gundín, O., Vázquez, A., & Rodríguez, C. (2017). Identifying gifted children: Congruence among different IQ measures. *Frontiers in Psychology, 8*. https://doi.org/10.3389/fpsyg.2017.01239

Fischer, C., Fishman, B., Levy, A. J., Eisenkraft, A., Dede, C., Lawrenz, F., Jia, Y., Kook, J. F., Frumin, K., & McCoy, A. (2020). When do students in low-SES schools perform better-than-expected on a high-stakes test? Analyzing school, teacher, teaching, and professional development characteristics. *Urban Education, 55*(8-9), 1280-1314. https://doi.org/10.1177/0042085916668953

Gagné, F. (1985). Giftedness and talent: Reexamining a reexamination of the definitions. *Gifted Child Quarterly*, *29*(3), 103-112. https://doi.org/10.1177/001698628502900302

Gagné, F. (2005). From gifts to talents: The DMGT as a developmental model. In R. Sternberg & J. Davidson (Eds.), *Conceptions of giftedness* (pp. 98–119). Cambridge University Press. https://doi.org/10.1017/CBO9780511610455.008

Gall, M. D., Gall, J. P., & Borg, W. (2007). *Educational Research: An introduction* (8th edition).

Pearson.

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. Basic Books.

Gardner, H. (2008). *Multiple intelligences: New horizons in theory and practice.* Basic Books.

Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences*. Basic Books.

Gheyssens, E., Coubergs, C., Griful-Freixenet, J., Engels, N., & Struyven, K. (2020). Differentiated instruction: The diversity of teachers' philosophy and praxis to adapt teaching to students' interests, readiness and learning profiles. *International Journal of Inclusive Education*, 1-18. https://doi.org/10.1080/13603116.2020.1812739

Ginja, T. G., & Chen, X. (2020). Teacher Educators' Perspectives and Experiences towards Differentiated Instruction. *International Journal of Instruction, 13*(4). https://doi.org/10.29333/iji.2020.13448a

Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *The Academy of Management Review, 17*(2), 183-211. https://doi.org/10.2307/258770

Goddard, R. D., & Goddard, Y. L. (2001). A multilevel analysis of the relationship between teacher and collective efficacy in urban schools. *Teaching and Teacher Education, 17*(7), 807-818. https://doi.org/10.1016/S0742-051X(01)00032-4

Goddard, Y. L., Goddard, R. D., Bailes, L. P., & Nichols, R. (2019). From school leadership to differentiated instruction: A pathway to student learning in schools. *The Elementary School Journal, 120*(2), 197-219. https://doi.org/10.1086/705827

Goddard, R. D., Skrla, L., & Salloum, S. J. (2017). The role of collective efficacy in closing student achievement gaps: A mixed methods study of school leadership for excellence

and equity. *Journal of Education for Students Placed at Risk, 22*(4), 220-236. https://doi.org/10.1080/10824669.2017.1348900

Goings, R. B., & Ford, D. Y. (2018). Investigating the intersection of poverty and race in gifted education journals: A 15-year analysis. *The Gifted Child Quarterly, 62*(1), 25-36. https://doi.org/10.1177/0016986217737618

Gossman, P. & Horder, S. (2016). Effective teacher? Student self-evaluation of development and progress on a teacher education programme. *Journal of Further and Higher Education, 40*(4), 447-465. https://doi.org/10.1080/0309877X.2014.984595

Graefe, A. K., & Ritchotte, J. A. (2019). An exploration of factors that predict advanced placement exam success for gifted Hispanic students. *Journal of Advanced Academics, 30*(4), 441-462. https://doi.org/10.1177/1932202X19853194

Grant, C., & Osanloo, A. (2014). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your "house". *Administrative Issues Journal Education Practice and Research, 4*(2), 12-26. https://doi.org/10.5929/2014.4.2.9

Green, S. B, & Salkind, N. J. (2017). *Using SPSS for Windows and Macintosh: Analyizing data and understanding the data* (8th ed.). Pearson.

Grissom, J. A., & Redding, C. (2016). Discretion and disproportionality: Explaining the underrepresentation of high-achieving students of color in gifted programs. *AERA Open*. https://doi.org/10.1177/2332858415622175

Grudnoff, L., Haigh, M., & Mackisack, V. (2017). Re-envisaging and reinvigorating school-university practicum partnerships. *Asia-Pacific Journal of Teacher Education, 45*(2), 180-193. https://doi.org/10.1080/1359866X.2016.1201043

Gubbins, E. J., Siegle, D., Ottone-Cross, K., McCoach, D. B., Langley, S. D., Callahan, C. M., Brodersen, A. V., & Caughey, M. (2021). Identifying and Serving Gifted and Talented Students: Are Identification and Services Connected? *Gifted Child Quarterly*. https://doi.org/10.1177/0016986220988308

Hamilton, R., McCoach, D. B., Tutwiler, M. S., Siegle, D., Gubbins, E. J., Callahan, C. M., Brodersen, A. V., & Mun, R. U. (2018). Disentangling the roles of institutional and individual poverty in the identification of gifted students. *Gifted Child Quarterly, 62*(1), 6-24. https://doi.org/10.1177/0016986217738053

Hansen, J. B., & Feldhusen, J. F. (1994). Comparison of trained and nontrained teachers of gifted students. *Gifted Child Quarterly, 38*(3), 115-121. https://doi.org/10.1177/001698629403800304

Hodges, J., Tay, J., Maeda, Y., & Gentry, M. (2018). A meta-analysis of gifted and talented identification practices. *Gifted Child Quarterly, 62*(2), 147-174. https://doi.org/10.1177/0016986217752107

Huang, J. (2015). Cultivating teacher thinking: Ideas and practice. *Educational Research for Policy and Practice, 14*(3), 247-257. https://doi.org/10.1007/s10671-015-9184-1

Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).

Jenkins, M. D. (1939). The mental ability of the American Negro. *The Journal of Negro Education, 8*(3), 511-520. https://doi.org/10.2307/2292647

Johnsen, S. K., Fearon-Drake, D., & Wisely, L. W. (2020). A formative evaluation of differentiation practices in elementary cluster classrooms. *Roeper Review, 42*(3), 206-218. https://doi.org/10.1080/02783193.2020.1765921

Johnsen, S. K., Haensly, P. A., Ryser, G. R., & Ford, R. F. (2002). Changing general education classroom practices to adapt for gifted students. *The Gifted Child Quarterly, 46*(1), 45-63. https://doi.org/10.1177/001698620204600105

Johnsen, S. K., & Kaul, C. R. (2019). Assessing teacher beliefs regarding research-based practices to improve services for GT students. *Gifted Child Today Magazine, 42*(4), 229-239. https://doi.org/10.1177/1076217519862332

Kaya, F., Stough, L. M., & Juntune, J. (2016). The effect of poverty on the verbal scores of gifted students. *Educational Studies, 42*(1), 85-97. https://doi.org/10.1080/03055698.2016.1148585

Kaur, A., Noman, M., & Awang-Hashim, R. (2019). Exploring and evaluating differentiated assessment practices of inservice teachers for components of differentiation. *Teaching Education, 30*(2), 160-176. https://doi.org/10.1080/10476210.2018.1455084

Knight, S. M. (2016). The self-reported relationship between a teacher's perception of learner characteristics for students with disabilities and a teacher's use of differentiated instruction in Georgia public schools grades 6-12 [Doctoral Dissertation, Liberty University]. ProQuest Publishing.

Koniewski, M. (2019). The teacher self-efficacy scale (TSES) factorial structure evidence review and new evidence from Polish-speaking samples. *European Journal of Psychological Assessment, 35*(6), 900-912. https://doi.org/10.1027/1015-5759/a000475

Künsting, J., Neuber, V., & Lipowsky, F. (2016). Teacher self-efficacy as a long-term predictor of instructional quality in the classroom. *European Journal of Psychology of Education, 31*(3), 299-322. https://doi.org/10.1007/s10212-015-0272-7

Ladson-Billings, G., & Tate, W. F., IV. (1995). Toward a critical race theory of

education. *Teachers College Record, 97*(1), 47-68. Retrieved April 3, 2020, from https://www.tcrecord.org/

Lakin, J. M. (2018). Making the cut in gifted selection: Score combination rules and their impact on program diversity. *Gifted Child Quarterly, 62*(2), 210-219. https://doi.org/10.1177/0016986217752099

Lamb, K. N., Boedeker, P., & Kettler, T. (2019). Inequities of enrollment in gifted education: A statewide application of the 20% equity allowance formula. *Gifted Child Quarterly, 63*(4), 205-224. https://doi.org/10.1177/0016986219830769

Liberty University [LU]. (2021). *Institutional Review Board*. https://www.liberty.edu/graduate/institutional-review-board/

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation. A 35-year odyssey. *The American Psychologist, 57*(9), 705-717. https://doi.org/10.1037//0003-066X.57.9.705

Machts, N., Kaiser, J., Schmidt, F. T. C., & Möller, J. (2016). Accuracy of teachers' judgments of students' cognitive abilities: A meta-analysis. *Educational Research Review, 19*, 85-103. https://doi.org/10.1016/j.edurev.2016.06.003

Matthews, M. S., & Rhodes, H. A. (2020). Examining identification practices and services for young advanced and gifted learners in selected North Carolina school districts. *Journal of Advanced Academics, 31*(4), 411-435. https://doi.org/10.1177/1932202X20908878

McBee, M. T., Peters, S. J., & Miller, E. M. (2016). The impact of the nomination stage on gifted program identification: A comprehensive psychometric analysis. *Gifted Child Quarterly, 60*(4), 258-278. https://doi.org/10.1177/0016986216656256

McCall, M., Gasaway, J., Howell, L., Rogers, R., Osborne, L., Goree, K., Merritt, B., Cox, H., Fischer, J., & Gardner, P. (2017). Baylor university and midway independent school district: An exemplary partnership. *School-University Partnerships, 10*(2), 8-12.

Melese, S. (2019). Instructors' knowledge, attitude and practice of differentiated instruction: The case of college of education and behavioral sciences, Bahir Dar University, Amhara Region, Ethiopia. *Cogent Education, 6*(1) https://doi.org/10.1080/2331186X.2019.1642294

Miller, E. M. (2009). The effect of training in gifted education on elementary classroom teachers' theory-based reasoning about the concept of giftedness. *Journal for the Education of the Gifted, 33*(1), 65-105. https://doi.org/10.1177/016235320903300104

Moosa, V., & Shareefa, M. (2019). The impact of teachers' experience and qualification on efficacy, knowledge and implementation of differentiated instruction. *International Journal of Instruction, 12*(2), 587-604. https://doi.org/10.29333/iji.2019.12237a

Naglieri, J. A., & Ford, D. Y. (2003). Addressing underrepresentation of gifted minority children using the Naglieri Nonverbal Ability Test (NNAT). *Gifted Child Quarterly, 47*(2), 155-160. https://doi.org/10.1177/001698620304700206

National Association for Gifted Children. (n.d.a). *Frequently asked questions about the common core and gifted education.* Retrieved from https://www.nagc.org/resources-publications/resources/timely-topics/common-core-state-standards-national-science-0

National Association for Gifted Children. (n.d.b). *Gifted education strategies.* Retrieved from https://www.nagc.org/resources-publications/gifted-education-practices

National Association for Gifted Children. (n.d.c). *Glossary of terms.* Retrieved from nagc.org

National Association for Gifted Children (n.d.d). *Supporting gifted children*. Retrieved from nagc.org

National Association for Gifted Children (2015). *State of the states in gifted education: Policy and practice data.* http://www.nagc.org/sites/default/files/key%20reports/2014-2015%20State%20of%20the%20States%20%28final%29.pdf

National Association for Gifted Children (NAGC). (2019, July 11). *Position statement: A definition of giftedness that guides best practice.* https://www.nagc.org/sites/default/files/Position%20Statement/Definition%20of%20Giftedness%20%282019%29.pdf

National Association for Gifted Children (2020). *State of the states in gifted education.* https://www.nagc.org/2018-2019-state-states-gifted-education

National Center for Children in Poverty. (2018). *50 States demographic data generator*. Retrieved from www.nccp.org

National Center for Education Statistics. (2019). *Status and trends in the education of racial ethnic groups.* Retrieved from https://nces.ed.gov

No Child Left Behind Act of 2001, 20 U.S.C. § 6319 (2008).

Olszewski-Kubilius, P., & Corwith, S. (2018). Poverty, academic achievement, and giftedness: A literature review. *Gifted Child Quarterly, 62*(1), 37-55. https://doi.org/10.1177/0016986217738015

Olszewski-Kubilius, P., Steenbergen-Hu, S., Thomson, D., & Rosen, R. (2017). Minority achievement gaps in STEM: Findings of a longitudinal study of Project Excite. *Gifted Child Quarterly, 61*(1), 20-39. https://doi.org/10.1177/0016986216673449

Park, V., & Datnow, A. (2017). Ability grouping and differentiated instruction in an era of data-driven decision making. *American Journal of Education, 123*(2), 281-306. https://doi.org/10.1086/689930

Peters, S. J., & Engerrand, K. G. (2016). Equity and excellence: Proactive efforts in the identification of underrepresented students for gifted and talented services. *Gifted Child Quarterly*, 60(3). 159-171. https://doi.org/10.1177/0016986216643165

Peters, S. J., Gentry, M., Whiting, G. W., & McBee, M. T. (2019). Who gets served in gifted education? Demographic representation and a call for action. *Gifted Child Quarterly, 63*(4), 273-287. https://doi.org/10.1177/0016986219833738

Plucker, J. A., & Callahan, C. M. (2017). Special gifts and talents. (pp. 428-444). https://doi.org/10.4324/9781315517698

Plucker, J. A., & Peters, S. J. (2018). Closing poverty-based excellence gaps: Conceptual, measurement, and educational issues. The Gifted Child Quarterly, 62(1), 56-67. https://doi.org/10.1177/0016986217738566

Poulou, M. S., Reddy, L. A., & Dudek, C. M. (2019). Relation of teacher self-efficacy and classroom practices: A preliminary investigation. *School Psychology International, 40*(1), 25-48. https://doi.org/10.1177/0143034318798045

Pozas, M., Letzel, V., & Schneider, C. (2020). Teachers and differentiated instruction: Exploring differentiation practices to address student diversity. J*ournal of Research in Special Educational Needs, 20*(3), 217-230. https://doi.org/10.1111/1471-3802.12481

Prast, E. J., Van de Weijer-Bergsma, E., Kroesbergen, E. H., & Van Luit, J. E. H. (2018). Differentiated instruction in primary mathematics: Effects of teacher professional

development on student achievement. *Learning and Instruction, 54*, 22-34. https://doi.org/10.1016/j.learninstruc.2018.01.009

Puzio, K., Colby, G. T., & Algeo-Nichols, D. (2020). Differentiated literacy instruction: Boondoggle or best practice? *Review of Educational Research, 90*(4), 459-498. https://doi.org/10.3102/0034654320933536

Ramli, R., & Yusoff, N. M. (2020). Self-efficacy and differentiated instruction: A study among Malaysian school teachers. *Universal Journal of Educational Research, 8*(4), 1252-1260. https://doi.org/10.13189/ujer.2020.080416

Raven, J. (2000). The Raven's progressive matrices: Change and stability over culture and time. *Cognitive Psychology, 41*(1), 1-48. https://doi.org/10.1006/cogp.1999.0735

Renzulli, J. S. (1976). The enrichment triad model: A Guide for developing defensible programs for the gifted and talented. *Gifted Child Quarterly, 20*(3), 303–306. https://doi.org/10.1177/001698627602000327

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

Reynolds, H. M., Wagle, A. T., Mahar, D., Yannuzzi, L., Tramonte, B., & King, J. (2016). Changes in residents' self-efficacy beliefs in a clinically rich graduate teacher education program. *Action in Teacher Education, 38*(2), 137-155. https://doi.org/10.1080/01626620.2016.1155096

Rhew, E., Piro, J. S., Goolkasian, P., & Cosentino, P. (2018). The effects of a growth mindset on self-efficacy and motivation. *Cogen Education 5*(1). https://doi.org/10.1080/2331186X.2018.1492337

Ricciardi, C., Haag-Wolf, A., & Winsler, A. (2020). Factors associated with gifted identification for ethnically diverse children in poverty. *The Gifted Child Quarterly, 64*(4), 243-258. https://doi.org/10.1177/0016986220937685

Riverside Insights. (2020). *Cognitive Abilities Test (CogAT) form 7 and form 8.* https://www.riversideinsights.com/apps/cogat

Robertson, S., & Pfeiffer, S. (2016). Development of a procedural guide to implement response to intervention (RtI) with high-ability learners. *Roeper Review, 38*(1), 9-23. https://doi.org/10.1080/02783193.2015.1112863

Rockinson-Szapkiw, A. (2013a). *Statistics guide.* The doctoral journey. http://amandaszapkiw.com/elearning/statistics-guide/downloads/Statistics-Guide.pdf

Rockinson-Szapkiw, A. [The Doctoral Journey]. (2013b, August 30). *Bivariate linear regression* [Video]. YouTube. https://youtu.be/TKom54uOzXY

Rothenbusch, S., Zettler, I., Voss, T., Lösch, T., & Trautwein, U. (2016). Exploring reference group effects on teachers' nominations of gifted students. *The Journal of Educational Psychology, 108*(6), 883-897. https://doi.org/10.1037/edu0000085

Ryser, G. R., & McConnell, K. (2004). *Scales for identifying gifted students.* Prufrock Press.

Santangelo, T. & Tomlinson, C. A. (2009). The application of differentiated instruction in postsecondary environments: Benefits, challenges, and future directions. *International Journal of Teaching and Learning in Higher Education*, *20*(3), 307-323.

Santangelo, T., & Tomlinson, C. A. (2012). Teacher educators' perceptions and use of differentiated instruction practices: An exploratory investigation. *Action in Teacher Education, 34*(4), 309-327. https://doi.org/10.1080/01626620.2012.717032

School District 1 Pseudonym (n.d.). [redacted]. https://www.[redacted].org/

School District 2 Pseudonym (n.d.). [redacted]. https://www.[redacted]/

School District 3 Pseudonym (2021[redacted]

https://www.[redacted].org/[redacted]

School District 4 Pseudonym (n.d.). [redacted]. https://www.[redacted]/

Siegle, D., Gubbins, E. J., O'Rourke, P., Langley, S. D., Mun, R. U., Luria, S. R., Little, C. A., McCoach, D. B., Knupp, T., Callahan, C. M., & Plucker, J. A. (2016). Barriers to underserved students' participation in gifted programs and possible solutions. *Journal for the Education of the Gifted, 39*(2), 103-131. https://doi.org/10.1177/0162353216640930

Smale-Jacobse, A. E., Meijer, A., Helms-Lorenz, M., & Maulana, R. (2019). Differentiated instruction in secondary education: A systematic review of research evidence. *Frontiers in Psychology, 10*, 2366-2366. https:/doi.org10.3389/fpsyg.2019.02366

Sousa, D. A., & Tomlinson, C. A. (2018). *Differentiation and the brain: How neuroscience supports the learner-friendly classroom* (Second ed.). ASCD.

South Carolina Department of Education [SCDE]. (2017, June). *Gifted and talented education overview.* https://ed.sc.gov/scdoe/assets/File/instruction/standards/Advanced%20Programs/Overview.pdf

South Carolina Department of Education [SCDE]. (2018, June). *Gifted and talented best practices guidelines: Curriculum and instruction.* https://ed.sc.gov/instruction/standards-

learning/advanced-academic-programs/gifted-and-talented/gifted-and-talented-curriculum/

South Carolina Department of Education [SCDE]. (2021a). *Active student headcounts.* https://ed.sc.gov/data/other/student-counts/active-student-headcounts/

South Carolina Department of Education [SCDE]. (2021b). *Gifted and talented.* https://ed.sc.gov/instruction/standards-learning/advanced-academic-programs/gifted-and-talented/

South Carolina Department of Education [SCDE]. (2021c). *School report card.* https://ed.sc.gov/data/report-cards/sc-school-report-card/

South Carolina Department of Education [SCDE]. (2021d). *South Carolina teachers counts by race and gender, 2019-2020.* https://ed.sc.gov/data/other/Teacher-Data/#TCRG

Spearman C. (1904). General intelligence objectivity determined and measured. *The American Journal of Psychology, 15*(2), 201-292. https://doi.org/10.2307/1412107

Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. Cambridge University Press.

Sternberg, R. J. (1999a). A triarchic approach to the understanding and assessment of intelligence in multicultural populations. *Journal of School Psychology, 37*(2), 145-159. https://doi.org/10.1016/S0022-4405(98)00029-6

Sternberg, R. J. (1999b). The theory of successful intelligence. *Review of General Psychology, 3*(4), 292-316. https://doi.org/10.1037/1089-2680.3.4.292

Sternberg, R. J. (2018). Context-sensitive cognitive and educational testing. *Educational Psychology Review, 30*(3), 857-884. https://doi.org/10.1007/s10648-017-9428-0

Sternberg, R. J., & Grigorenko, E. L. (2002). The theory of successful intelligence as a basis for gifted education. *Gifted Child Quarterly, 46*(4), 265-277. https://doi.org/10.1177/001698620204600403

Suprayogi, M. N., Valcke, M., & Godwin, R. (2017). Teachers and their implementation of differentiated instruction in the classroom. *Teaching and Teacher Education, 67*, 291-301. https://doi.org/10.1016/j.tate.2017.06.020

The University of Iowa. (2020). *Addressing district assessment needs: Using the Iowa assessments.* http://itp.education.uiowa.edu/

Thomas, K. E., & Mucherah, W. M. (2016). The contextual difference: Developing preservice teacher efficacy through immersive learning experiences. *Education and Urban Society, 48*(4), 364-383. https://doi.org/10.1177/0013124514533795

Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners* (2nd ed.). ASCD.

Tomlinson, C. A. (2017). *How to differentiate instruction in academically diverse classrooms* (3rd edition). ASCD.

Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., Conover, L. A., & Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. *Journal for the Education of the Gifted, 27*(2-3), 119-145. https://doi.org/10.1177/016235320302700203

Tomlinson, C. A., & McTighe, J. (2006). *Integrating differentiated instruction & understanding by design: Connecting content and kids*. ASCD.

Tomlinson, C. A., & Moon, T. R. (2013). *Assessment and student success in a differentiated classroom*. ASCD.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783-805. https://doi.org/10.1016/S0742-051X(01)00036-1

Tschannen-Moran, M., & Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. Teaching and Teacher Education, 23(6), 944-956. https://doi.org/10.1016/j.tate.2006.05.003

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248. https://doi.org/10.3102/00346543068002202

United States National Commission on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. https://www2.ed.gov/pubs/NatAtRisk/risk.html

van Geel, M., Keuning, T., Frèrejean, J., Dolmans, D., van Merriënboer, J., & Visscher, A. J. (2019). Capturing the complexity of differentiated instruction. *School Effectiveness and School Improvement, 30*(1), 51-67. https://doi.org/10.1080/09243453.2018.1539013

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

VanTassel-Baska, J., Hubbard, G. F., & Robbins, J. I. (2020). Differentiation of instruction for gifted learners: Collated evaluative studies of teacher classroom practices. *Roeper Review, 42*(3), 153-164. https://doi.org/10.1080/02783193.2020.1765919

Vreys, C., Ndungbogun, G. N., Kieboom, T., & Venderickx, K. (2018). Training effects on Belgian preschool and primary school teachers' attitudes towards the best practices for gifted children. *High Ability Studies, 29*(1), 3-22. https://doi.org/10.1080/13598139.2017.1312295

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. (M. Cole, Ed.). Harvard University Press.

Wan, S. W. (2016). Differentiated instruction: Hong Kong prospective teachers' teaching efficacy and beliefs. *Teachers and Teaching, 22*(2), 148-176. https://doi.org/10.1080/13540602.2015.1055435

Wan, S. W. (2017). Differentiated instruction: Are Hong Kong in-service teachers ready? *Teachers and Teaching, Theory and Practice, 23*(3), 284-311. https://doi.org/10.1080/13540602.2016.1204289

Wan, S. W. (2020). Unpacking the relationship between teachers' perceptions of professional learning communities and differentiated instruction practice. *ECNU Review of Education,3* https://doi.org/10.1177/2096531120969988

Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques* (2nd edition). Sage Publishing.

Whitley, J., Gooderham, S., Duquette, C., Orders, S., & Cousins, J. B. (2019). Implementing differentiated instruction: A mixed-methods exploration of teacher beliefs and practices. *Teachers and Teaching, 25*(8). 1043-1061. https://doi.org/10.1080/13540602.2019.1699782

Wiggins, G., & McTighe, J. (2005). *Understanding by design (Expanded 2nd ed.)*. Association for Supervision and Curriculum Development.

Wilson, C., Marks Woolfson, L., & Durkin, K. (2018). School environment and mastery experience as predictors of teachers' self-efficacy beliefs towards inclusive teaching. *International Journal of Inclusive Education, 24*(2), 218-234. https://doi.org/10.1080/13603116.2018.1455901

Yaluma, T., & Tyner A. (2018). *Is there a gifted gap? Gifted education in high-poverty schools.* (Research Report No. 1.31). Thomas B. Fordham Institute. https://fordhaminstitute.org/national/research/there-gifted-gap-gifted-education-high-poverty-schools

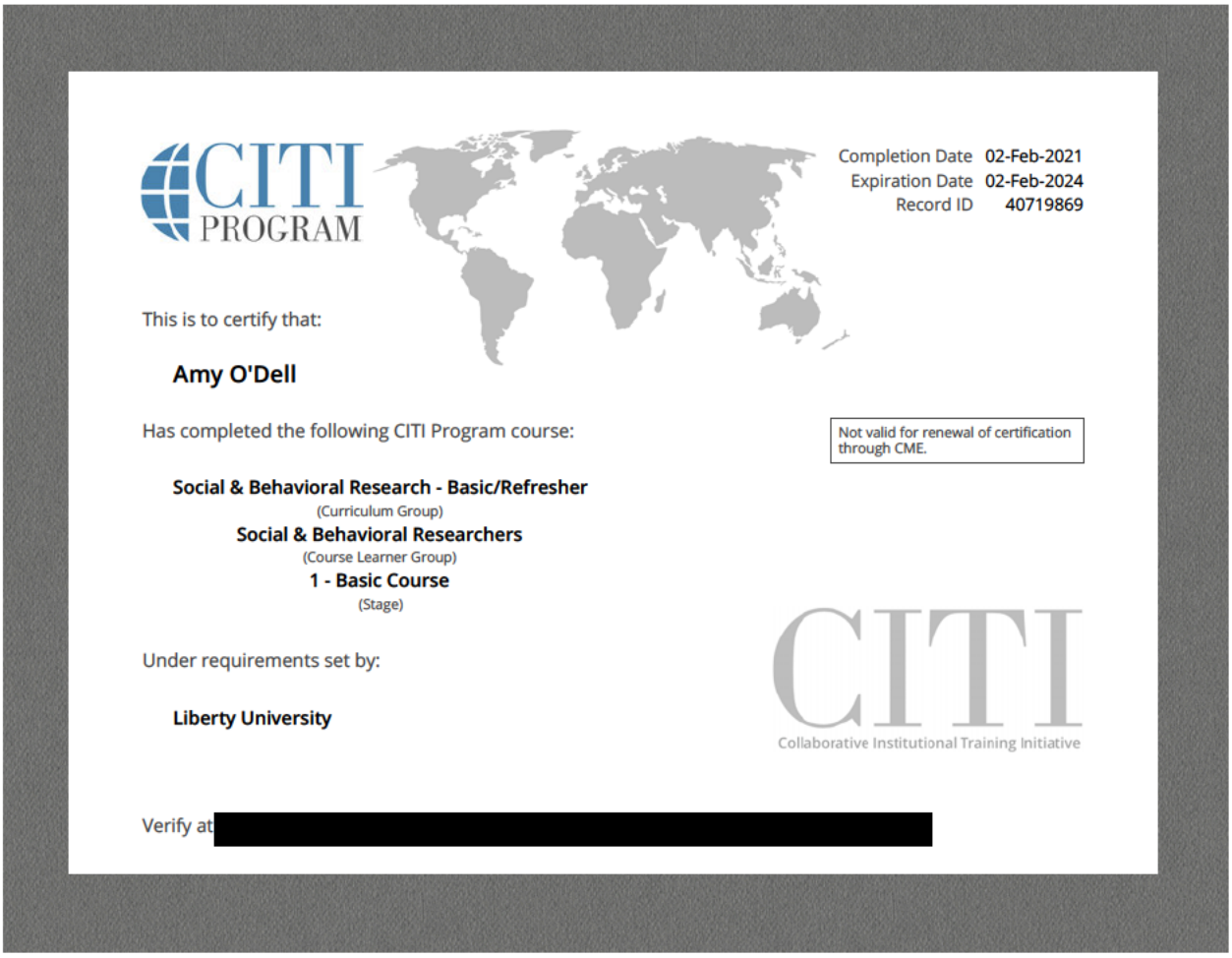
Yeager, D. S., & Dweck, C. S. (2020). What can be learned from growth mindset controversies? *The American Psychologist, 75*(9), 1269-1284. https://doi.org/10.1037/amp0000794

Yough, M. (2019). Tapping the sources of self-efficacy: Promoting preservice teachers' sense of efficacy for instructing English language learners. *The Teacher Educator, 54*(3), 206-224. https://doi.org/10.1080/08878730.2018.1534031

Zee, M., & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research, 86*(4), 981-1015. https://doi.org/10.3102/0034654315626801

# APPENDICES

## APPENDIX A



CITI PROGRAM

Completion Date 02-Feb-2021
Expiration Date 02-Feb-2024
Record ID 40719869

This is to certify that:

**Amy O'Dell**

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

**Social & Behavioral Research - Basic/Refresher**
(Curriculum Group)
**Social & Behavioral Researchers**
(Course Learner Group)
**1 - Basic Course**
(Stage)

Under requirements set by:

**Liberty University**

CITI
Collaborative Institutional Training Initiative

Verify at [redacted]

# APPENDIX B

IRB Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 31, 2021

Amy O'Dell
[redacted]

Re: IRB Exemption - [redacted] The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes

Dear Amy O'Dell, [redacted],

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

**Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB.** Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at [redacted]

Sincerely,
[redacted]
*Administrative Chair of Institutional Research*
**Research Ethics Office**

# APPENDIX C

## Permission to Conduct Research in School District 1

June 9, 2021

[redacted]
[redacted] School District
[redacted] Street
[redacted] SC [redacted]

Dear Superintendent [redacted]

As a graduate student in the School of Education at Liberty University, I am preparing to conduct research as part of the requirements for a doctoral degree. The title of my research project is *The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes*. The purpose of the study is to examine the relationship between gifted endorsement, teachers' self-efficacy, and teachers' use of differentiated instructional (DI) strategies. I intend to add to existing research seeking to improve gifted identification among students affected by poverty by using interventions such as implementing DI strategies.

I would like to utilize your district's email list to recruit participants for my research study. I am requesting that the email containing the link to the survey be sent by the district data and communications team. I do not seek to access teachers' email addresses nor to communicate with your faculty after the survey is complete. I also will not need to visit school campuses unless requested to do so by your administrative team. The data needed for the analysis will be provided by the teachers completing the surveys. The remaining information needed relates to descriptive demographic data reported by the district to the South Carolina Department of Education and will be used to describe the target population for the study. A pseudonym will be used for the district and no personally identifying data will be collected from the participating teachers.

In the email sent to the teachers, the purpose of the study will be explained and teachers wishing to participate will be asked to go to Qualtrics and click on the link provided to complete the surveys. Participants will be presented with informed consent information prior to participating. Taking part in this study is completely voluntary, and participants are welcome to discontinue their participation at any time. The data collected by Qualtrics will be download and entered into a statistical analysis program for analysis. Upon completion of the study, you will be granted access to the findings.

Thank you for considering my request. To indicate your agreement to allow me to conduct the study, please either sign this letter and return it to me via email as a pdf or respond to this email granting me permission to implement my study. If you have any questions, please feel free to contact me.

Sincerely,

Amy Dean O'Dell
[redacted]
PhD Candidate
School of Education, Liberty University

Participation is approved
[redacted] Ph.D.
Superintendent

Permission to Conduct Research in School District 2

[redacted]
[redacted] SC [redacted]
Phone: [redacted] • Fax: [redacted] • www[redacted].net [redacted]

October 4, 2021

Dear Amy,

This letter is to serve as approval of your educational research to be conducted at various elementary and middle schools within [redacted] [redacted] expectations of any research project and the researcher are listed below:

- [redacted] administrators and teachers should be in full agreement of assisting with this research
- Loss of instructional time will be limited
- Student participation is optional and parent permission is required (if applicable)
- The researcher should meet with identified students to provide a brief summary of the research
- Student grades, classwork, or projects will not be affected
- Student names should not be used in the research
- Any and all student data provided by the district/school will remain confidential within the scope of the project
- Any and all student data generated by the researcher will remain confidential within the scope of the project
- All findings will be shared with the school principal and district level administration.

If the expectations above are satisfactory, please sign and return the original to me as soon as possible. Please keep a copy for your records.

I wish you the very best in this endeavor. I look forward to reviewing your data and have hope that your results can be used to positively influence our programs.

Most sincerely,

[redacted]

[redacted]
Assistant Superintendent

[redacted] 10/4/2021

Signature of Researcher Date

# Permission to Conduct Research in School District 3

**Request to Conduct Research**

**O'Dell, Amy** [redacted]

Wed 5/26/2021 11:43 AM

**To:** [redacted] <[redacted]>

Dr. [redacted],

I am currently preparing to conduct research as part of the requirements for a doctoral degree at Liberty University. I am writing to request your permission to conduct my study in the [redacted] School District.

The title of my research study is *The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes.* The purpose of the study is to examine the relationship between gifted endorsement and teachers' use of differentiated instructional (DI) strategies. I hope to add to existing research seeking to improve gifted identification among students affected by poverty by using interventions such as implementing DI strategies.

Faculty volunteers will be asked to complete an online survey and provided with informed consent information before participating. Taking part in this study is completely voluntary, and participants are welcome to discontinue their participation at any time.

Thank you for considering my request. If you choose to grant permission, simply respond by email to [redacted] or provide a signed statement on official letterhead indicating your approval. Please feel free to contact me with any questions.

Sincerely,

Amy Dean O'Dell
Doctoral Candidate
Liberty University
[redacted]

**[External] RE: Request to Conduct Research**

[redacted] <[redacted].org>

Wed 5/26/2021 1:16 PM

**To:** O'Dell, Amy <[redacted]>

[ EXTERNAL EMAIL: Do not click any links or open attachments unless you know the sender and trust the content. ]

Amy,
Permission is granted to conduct research in our district. I'll be interested in reading your research study upon your completion. Best wishes,

[redacted]
Dr. [redacted], Superintendent

Permission to Conduct Research School District 4

**Re: [EXTERNAL] Doctoral Research Study**

[redacted].org>
Wed 11/3/2021 9:00 AM
To: O'Dell, Amy [redacted]>

Hi Amy,
The district gives permission to include the faculty of [redacted] in the study titled "*The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes."*

On Thu, Oct 21, 2021at 9:56AM O'Dell, Amy [redacted]:
Good morning [redacted],

Your sending the email is the preferred means of contacting participants so that their anonymity is protected. But I have to submit a form to the university to show that I have your permission to send the email to you and your staff.

You can respond to this email stating that I have your permission to include the faculty of [redacted] in the study noted below. Or, if you prefer, I attached a letter to this email that you can sign and return to me electronically.
Thank you so much for considering my request. I will submit your signed permission letter or email response to the university as soon as I receive it so that I can get the email and survey to you ASAP.

Thanks again,

Amy Dean O'Dell
Doctoral Candidate
Liberty University
[redacted]

*Dear* [redacted]

*As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a Ph.D. degree in Education specializing in Curriculum and Instruction. I am contacting you to request permission to invite the faculty of the* [redacted] *to participate in my study.*

*The title of my research study is The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes. The purpose of the study is to examine the relationship between gifted endorsement, teachers' use of differentiated instructional (DI) strategies, and their sense of self-efficacy. The survey is anonymous and the study's design ensures the anonymity of the participants and the school district.*

*Faculty volunteers will be asked to complete an online survey and be provided with informed consent information before participating. Taking part in this study is voluntary, anonymous, and participants may choose to discontinue their participation at any time. Teachers who participate may choose to enter their email addresses in a raffle to win one of six $25.00* [redacted] *gift cards. To ensure anonymity, the email addresses will be collected and stored separately from participant responses.*

*Thank you for considering my request. If you choose to grant permission, simply respond by email to* [redacted] *or provide a signed statement on official letterhead indicating your approval. Please feel free to contact me with any questions or to discuss the study in greater detail.*

*Amy Dean O'Dell*
*Doctoral Candidate*
*Liberty University, School of Education*
[redacted]

# Permission to Include a Participant Incentive School District 1

**From:** [redacted] org>
**Sent:** Wednesday, July 28, 2021 1:55 PM
**To:** O'Dell, Amy <[redacted]>
**Subject:** [External] Fwd: Incentive for Research Study

---

[ EXTERNAL EMAIL: Do not click any links or open attachments unless you know the sender and trust the content. ]

---

Good Afternoon,

We have received Dr. [redacted] approval. Do you think I should go ahead and email the principals to give them a heads-up about your contact or wait a few more weeks?

Thank You,
[redacted]

------- ed ----
From: [redacted] <[redacted].org>
Date: Wed, Jul 28, 2021 at 10:30 AM
Subject: Re: Incentive for Research Study
To: [redacted] <[redacted].org>

Yes, I approve.

On Tue, Jul 27, 2021 at 5:32 PM [redacted] <[redacted]org> wrote:

> Good Evening,
>
> Mrs. O'Dell is the lady from Liberty University whom we agreed to participate in her research about Gifted and Talented. She is asking for your permission to offer a $25 gift card to a teacher to encourage their participation. Would you please let me know if you approve of her to provide this incentive?
>
> Thanks,

---------- Forwarded message ---------
From: **O'Dell, Amy** <[redacted]>
Date: Mon, Jul 26, 2021 at 11:19 PM
Subject: **I**ncentive for Research Study
To: [redacted] <[redacted].org>

[redacted],

I successfully defended my research proposal tonight and will submit my IRB approval forms by Thursday. My Chair told me to expect a four to six week wait, but the study could be approved earlier. This puts the study's start date in late August to early September. I am working ahead in order to be able to begin to collect data as soon as the IRB approves the study. As soon as I receive approval, I will contact you to set a date to send the surveys to the teachers. As the date for the study is now late August, would you also prefer that I contact the building principals in mid-August?

In order to increase the response rate for the study and as a "thank you" to the participants, I would like to offer the teachers the opportunity to win one of six $25 [redacted] cards. I have typed a letter addressed to Dr. [redacted] asking for [redacted] approval of the incentive. In the past, all of my correspondence with Dr. [redacted] has gone through you. If this is the preferred method of communication, please forward the attached letter to Dr. [redacted]. If you would prefer that I send the letter to Dr. [redacted], let me know and I will gladly forward the letter to [redacted].

Thanks again for your support of my research study! It was well-received during my defense this evening. 🙂

Amy Dean O'Dell
[redacted].org

Permission to Include a Participant Incentive School District 3

**[External] RE: Teacher Incentive for Research Study Participation**

[redacted]
Tue 7/27/2021 7:51 AM
**To:** O'Dell, Amy <[redacted]>

[ EXTERNAL EMAIL: Do not click any links or open attachments unless you know the sender and trust the content. ]

Good morning, Amy.
Thank you for this thoughtful gesture. You have my approval to proceed with the incentive for teachers who complete the survey.
[redacted]

[redacted] Superintendent
[redacted]

**Confidentiality Notice** | This e-mail message, including any attachments, is for the sole use of the intended recipient(s) and may contain confidential information. Any unauthorized review, use, disclosure, or distribution is prohibited. If you are not the intended recipient, immediately contact the sender by reply e-mail and destroy all copies of the original message.

---

**From:** O'Dell, Amy [redacted]
**Sent:** Monday, July 26, 2021 11:34 PM
**To:** [redacted]
**Subject:** Teacher Incentive for Research Study Participation

July 26, 2021

Dr. [redacted]
Superintendent
[redacted] School District

Dr. [redacted],

I wanted to ask your permission to include an incentive for teachers to participate in my research study that will begin in late August. The incentive will be a chance to win one of six $25 [redacted] cards. I need your permission because teachers wishing to earn the eGift card would need to share his or her email address with me after they complete the survey.

# APPENDIX D

**Table 14**

| ***Positive Site Relations Plan*** | | |
|---|---|---|
| Event | Stakeholder(s) | Communication |
| Initial Contact | Superintendents, assistant superintendent, curriculum instruction superintendent, director of assessment and evaluation, and program specialist | Email, phone call, permission letter |
| Initial Contact | Building principals (SD 1 and SD 3) | Email |
| Initiation of the study | Teachers (via district representatives) | Recruitment email with consent form and link to on-line survey. |
| Follow-up | District Representatives | Email to provide update on the status of the survey response. |
| Follow-up | Teachers | Reminder email for survey completion. |
| Follow-up | District Representatives | Email to share the findings and express gratitude for the opportunity to conduct the study. |

*Note* the site relations plan reflects the assertions of Gall et al. (2007) of the importance of setting and maintaining an ongoing positive relationship with the site and participants.

## APPENDIX E

Building principal contact email, Liberty University IRB Recruitment Email, Follow-Up Email, and thank you note (The email was adapted from the Liberty University (2021) IRB recruitment letter template.)

Building Principal Contact Email School District 3

As a doctoral candidate in the School of Education at Liberty University, I will be conducting research as part of the requirements for a Ph.D. degree and Dr. [redacted] has agreed to allow me to conduct the study in the [redacted]. My research project's title is *The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes*. The purpose of my research is to examine the relationship between teachers' sense of self-efficacy, differentiated instructional practices, and gifted education endorsement. The overarching topic addresses DI's use to provide appropriately challenging learning opportunities for gifted and advanced learners to possibly mediate the underrepresentation of students of color and students affected by poverty.

Although my study will not begin until after the 2021-2022 school year has begun, I wanted to reach out to you because the study will include your faculty. I will use online surveys disseminated by a secure web host, and the completion of the survey requires 30-40 minutes. The study will not interrupt the school day and not require me to visit the school campuses. The data collection process will be secure, and the surveys submitted anonymously.

Please feel free to contact me with any questions you may have. I look forward to working with you in the near future.

Amy Dean O'Dell
Doctoral Candidate
Liberty University School of Education
[redacted]

Building Principal Contact Email School District 1

Good afternoon [redacted] Principals,

As a doctoral candidate in the School of Education at Liberty University, I will be conducting research as part of the requirements for a Ph.D. degree. The district has graciously agreed to allow me to conduct the study by surveying the districts' certified personnel. My research project's title is *The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes*. The purpose of my research is to examine the relationship between teachers' sense of self-efficacy, differentiated instructional practices, and gifted education endorsement. The overarching topic addresses DI's use to provide appropriately challenging learning opportunities for gifted and advanced learners to possibly mediate the underrepresentation of students of color and students affected by poverty.

Although my study will not begin until early to mid-September, I wanted to reach out to you because the study will include your faculty. I will use online surveys disseminated by a secure web host, and the completion of the survey requires 30-40 minutes. The study will not interrupt the school day and not require me to visit my school campuses. The data collection process will be secure, and the surveys submitted anonymously. Teachers may choose to enter their email addresses for a chance to win one of six $25.00 [redacted] cards. The emails will not be connected to the participants' survey responses to ensure anonymity. The study's design will also ensure the districts' and schools' anonymity. At the study's conclusion, the results will be made available to the district.

Please feel free to contact me with any questions you may have. I look forward to working with you in the near future.

Amy Dean O'Dell
Doctoral Candidate
Liberty University School of Education
[redacted]

IRB Recruitment Letter

Dear Teachers,

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a PhD degree. The purpose of my research is to examine the relationship between teachers' sense of self-efficacy, differentiated instructional practices, and gifted education training, and I am writing to invite eligible participants to join my study.

Participants must be certified teachers currently teaching in grade K4 through grade 12 in a school district that offers gifted programming. Participants, if willing, will be asked to complete an online survey. It should take approximately 35 minutes to complete the survey. Participation will be completely anonymous, and no personal, identifying information will be collected unless you wish to enter a drawing for a chance to win one of six $25.00 [redacted] cards. If you choose to enter the drawing, you will be asked to enter your email address via a separate link after completing the survey. The email addresses will not be connected to your survey answers to ensure the survey's anonymity.

In order to participate, please click here Survey and follow the directions to complete the survey. Once you complete the survey, your participation is complete.

A consent document is provided as the first page of the survey. The consent document contains additional information about my research. You do not need to sign and return the consent document. After you have read the consent form, please proceed to the survey. Doing so will indicate that you have read the consent information and would like to take part in the survey.

Sincerely,

Amy O'Dell
PhD Candidate
[redacted]

Teacher Follow-up Email

Teachers,

The email below was recently sent to you inviting you to participate in an educational research study. If you would like to participate and have not already done so, the link for the survey and gift card raffle entry will remain active for a few more weeks.

Dear Teachers,

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a PhD degree. The purpose of my research is to examine the relationship between teachers' sense of self-efficacy, differentiated instructional practices, and gifted education training, and I am writing to invite eligible participants to join my study.

Participants must be certified teachers currently teaching in grade K4 through grade 12 in a school district that offers gifted programming. Participants, if willing, will be asked to complete an online survey. It should take approximately 35 minutes to complete the survey. Participation will be completely anonymous, and no personal, identifying information will be collected unless you wish to enter a drawing for a chance to win one of six $25.00 [redacted] cards. If you choose to enter the drawing, you will be asked to enter your email address via a separate link after completing the survey. The email addresses will not be connected to your survey answers to ensure the survey's anonymity.

In order to participate, please click here (Hyper Link Added) and follow the directions to complete the survey. Once you complete the survey, your participation is complete.

A consent document is provided as the first page of the survey. The consent document contains additional information about my research. You do not need to sign and return the consent document. After you have read the consent form, please proceed to the survey. Doing so will indicate that you have read the consent information and would like to take part in the survey.

Sincerely,

*Amy Dean O'Dell*
*Doctoral Candidate*
*Liberty University, School of Education*
[redacted]

Teacher Thank You Email Link to Raffle

Dear Teachers,

Thank you for your participation in the study examining teachers' sense of self-efficacy and their perception and implementation of differentiated instructional practices. The completion of the survey concludes your participation in the study. If you wish to enter your email address for a chance to win one of six $25 [redacted] cards, please click on the link below. Your email address will be separate from your survey responses to continue to insure your anonymity. If you do not wish to enter the drawing, simply close your browser and this concludes your participation in the study.

If you have questions or concerns, please feel free to contact me.

Again, thank you for your time and participation.

## Raffle Entry

Amy O'Dell
PhD Candidate
[redacted]

Raffle Form

Dear Teachers,

Please enter you email address in the box below and click submit. After clicking submit, please close your browser as this concludes your participation in the study. I will email the e-gift cards to the winners of the raffle at the conclusion of the study.

If you have questions or concerns, please feel free to contact me.

Again, thank you for your time and participation.

Amy O'Dell
PhD Candidate
[redacted]

# APPENDIX F

Permission from ASCD to reprint Figure 1.

**[External] RE: Permission to Use Tomlinson Graphic in Dissertation and Prospectus**

**Permissions** <[redacted]>
Sun 4/11/2021 10:06 PM
**To:** O'Dell, Amy <[redacted]>

[ EXTERNAL EMAIL: Do not click any links or open attachments unless you know the sender and trust the content. ]

Dear Amy:

In response to your request below, please consider this permission to use the referenced ASCD content for your personal research purposes. Should you include excerpts or cite content in a paper or some other report form, please credit the source accordingly. If your research results in use of our content in a product or publication for commercial release, please contact me again to secure further rights to do so. Thank you for your interest in Educational Leadership and good luck with your dissertation.

Sincerely yours,

**KATY WOGEC** • Permissions Consultant for ASCD
[redacted]

ASCD® LEARN. TEACH. LEAD.

**Join us:**

**From:** O'Dell, Amy <[redacted]>
**Sent:** Wednesday, April 07, 2021 1:00 PM
**To:** Permissions <[redacted]>
**Subject:** Permission to Use Tomlinson Graphic in Dissertation and Prospectus

Good Afternoon,

My study examines the relationship between differentiation, self-efficacy, and training. I am using Tomlinson's model to guide the examination of differentiation. I am requesting permission to use Figure 2.1 Differentiation of Instruction on page 425 (Kindle Edition) of The Differentiated Classroom: Responding to the Needs of All Learners, 2nd Ed. by C. A. Tomlinson.

Thank you for your consideration.

Sincerely,

Amy Dean O'Dell
Doctoral Candidate
Liberty University

# APPENDIX G

## Permission from Tschannen-Moran

**Permission to use the Short Form of the TSES**

O'Dell, Amy <[redacted]>

Mon 4/5/2021 2:23 PM

**To:** [redacted]

Good afternoon Dr. Tschannen-Moran,

My name is Amy Dean O'Dell, and I am a doctoral candidate at Liberty University. I am contacting you to request permission to use a survey created by you and Dr. Wolfolk Hoy. My dissertation topic addresses underrepresentation in gifted education and the role differentiation plays in providing quality opportunities to learn to students affected by the intersection of race, ethnicity, and poverty.

The study will examine the relationship between gifted training, self-efficacy, and teachers' perceptions and use of differentiated instructional practices. I read your 2001 article and additional articles that successfully used both versions of the TSES. I feel that the short version of the TSES will serve as a valuable instrument to measure in-service teachers' self-efficacy in relation to their use of differentiated instructional practices. I am currently writing my prospectus and wanted to contact you to secure written permission.

Thank you for your consideration. I look forward to hearing from you.

Sincerely,

Amy Dean O'Dell
Doctoral Candidate
Liberty University School of Education

**From:** [redacted]
**Sent:** Tuesday, Apr 6, 2021 10:14 AM
**To:** O'De , Amy <[redacted]>
**Cc:** [redacted]
**Subject:** [Externa ] Perm ss on Letter

Amy,

I have attached a letter of permission from Dr Tschannen-Moran, as well as directions for accessing the materials on her password-protected website Please let me know if you have any further questions

Regards,

[redacted]

**Re: [External] Permission Letter**

O'Dell, Amy <[redacted]>

Tue 4/6/2021 10:22 AM

**To:** [redacted]

[redacted]

Thank you so much for the quick response. I truly appreciate Dr. Tschannen-Moran agreeing to allow me to use the survey.

Respectfully,

Amy Dean O'Dell

William & Mary
School of Education

MEGAN TSCHANNEN-MORAN, PHD

PROFESSOR OF EDUCAT ONAL
LEADERS P

April 6, 2021

Amy,

You have my permission to use the Teacher Sense of Efficacy Scale (formerly called the Ohio State Teacher Sense of Efficacy Scale), which I developed with Anita Woolfolk Hoy, in your research.

[redacted]

You can find a copy of the measure and scoring directions on my web site at

Please use the following as the proper citation:

Tschannen-Moran, M & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783-805.

I will also attach directions you can follow to access my password protected web site, where you can find the supporting references for this measure as well as other articles I have written on this and related topics.

All the best,

Megan Tschannen-Moran
William & Mary School of Education

Teacher Self Efficacy Scale Short Form (Tschannen-Moran & Hoy, 2001)
Removed to Comply with Copyright

# APPENDIX H

## Permission from T. Santangelo

**[External] Re: Teachers' Perceptions and Use of Differentiated Instructional Practices**

Santangelo, Tanya <[redacted]>
Tue 4/6/2021 8:41 PM
**To:** O'Dell, Amy <[redacted]>

[ EXTERNAL EMAIL: Do not click any links or open attachments unless you know the sender and trust the content. ]

**Warm Greeting, Amy.**

**Thank you for your message below. I'm glad you found our questionnaire relevant for your dissertation and you have our permission to modify/use it as you'd like.**

**I wish you the best with your study--and everything that lays ahead for you. ☺**

**Sincerely,**
**Tanya**

On Mon, Apr 5, 2021 at 7:07 AM O'Dell, Amy <[redacted]> wrote:

> Good morning Dr. Santangelo,
>
> My name is Amy Dean O'Dell, and I am a doctoral candidate at Liberty University. I am contacting you to request permission to use a survey created by you and Dr. Tomlinson. My dissertation topic addresses underrepresentation in gifted education and the role differentiation plays in providing quality opportunities to learn to students affected by the intersection of race, ethnicity, and poverty.
>
> The study will examine the relationship between gifted training, self-efficacy, and teachers' perceptions and use of differentiated instructional practices. I read your 2012 article and feel that the survey used will serve as a valuable instrument to measure inservice teachers' use of differentiated instructional practices. I did not have a copy of the original survey and used the questions provided in the article to create the attached survey.
>
> Pleased find attached a PDF copy of the survey in which I bolded the minor changes I made. The changes reflect the k-12 classroom setting and include replacing "candidates" with "students" and "courses" with "classes" and removing the words "during office hours".
>
> Please feel free to contact me with any concerns or suggestions you have. I look forward to hearing from you.
>
> Sincerely,
>
> Amy Dean O'Dell
> Doctoral Candidate
> Liberty University School of Education

*Teachers' Perceptions and Use of Differentiated Instruction Practices Survey (TPUDIP)* (Knight, 2016; Santangelo & Tomlinson, 2012) based on the survey created by Santangelo and Tomlinson (2012) and ascribed with the name of the aforementioned article by a doctoral researcher (Knight, 2016).

Removed to Comply with Copyright

## APPENDIX I

# Participant Consent

**Title of the Project:** The Correlation Between Self-Efficacy, Differentiated Instruction, and Gifted Training in Schools Serving Students Originating from Under-Resourced Homes

**Principal Investigator:** Amy Dean O'Dell, Liberty University

### Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be a certified teacher currently teaching in a school district that offers gifted programming. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

### What is the study about and why is it being done?

The purpose of this quantitative bivariate correlational study is to examine the relationship between teachers' sense of self-efficacy, their use of differentiated instructional practices, and gifted training. The study will include teachers from all subject areas and grade levels to better understand the relationship between teachers' self-efficacy, their use of differentiational practices, and gifted training.

### What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following things:

1. Complete an online survey. The survey will take approximately 35 minutes or less to complete. Completion of the survey completes your participation in the study.

### How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study. However, benefits to society include improving the teaching profession by planning and implementing practical and effective training to enable teachers to effectively meet the academic needs of today's diverse classroom. The benefits also extend to teacher education programs in hopes of including differentiated instructional practices specific to gifted learners in the curriculum.

### What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

### How will personal information be protected?

The records of this study will be kept private. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be anonymous and no personally identifying information will be collected other than email addresses if participants choose to participate in a drawing for the chance to win an e-gift card. The email addresses will not be associated with the survey responses.
- Data will be stored on a password-locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

**How will you be compensated for being part of the study?**

Participants will have the opportunity to enter a drawing for the chance to win one of six $25 [redacted] cards. If you choose to enter the drawing, a link will be provided for you to enter your email address. The email address collection is separate from the data collection and will not be attached to your survey answers to insure your anonymity.

**Is study participation voluntary?**

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University or your school district. If you decide to participate, you are free to not answer any questions or withdraw at any time prior to submitting the survey without affecting those relationships.

**What should you do if you decide to withdraw from the study?**

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

**Whom do you contact if you have questions or concerns about the study?**

The researcher conducting this study is Amy Dean O'Dell. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her [redacted]. You may also contact the researcher's faculty sponsor, [redacted], at [redacted].

**Whom do you contact if you have questions about your rights as a research participant?**

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board [redacted] or email [redacted]

*Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.*

**Your Consent**

Before agreeing to be part of the research, please be sure that you understand what the study is about. If you have any questions about the study later, you can contact the researcher using the information provided above.

Proceeding to the survey signifies that you agree to the consent form. If you do not agree to the consent form, please close your internet browser/browser page.