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The Relationship Between Differentiated Instruction and 11th-Grade Students' Academic Performance

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This is to certify that the doctoral study by

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Walden University
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Abstract

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Jeffery Washington

MA, Liberty University, 2010

BS, Fort Valley State University, 2005

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

In 2007, the state of Georgia answered the call of the No Child Left Behind Act of 2001 with training that introduced differentiation instruction in the classroom. However, to date, few studies have investigated whether differentiated instruction in Georgia high school classrooms are associated with student success. The purpose of this quantitative study was to fill this gap in the literature by determining whether a significant relationship existed between levels of differentiated instruction and 11th-grade student scores on the standardized End-of-Course Tests (EOCTs) in a Georgia high school. The modern concept of differentiated instruction to improve pedagogy and erudition constituted the theoretical foundation for this study. The purposeful sample for the study included 15 teachers and 323 EOCT scores. Classroom differentiated instruction was assessed using 3 months of archival data from the Georgia Teacher Assessment Performance Standards (TAPS) rubric, such that each teacher received a differentiated instruction score based on each classroom of students (independent variable). Student success on standardized tests was operationalized as 11th-grade student scores in each classroom on the EOCT (dependent variable). Teacher TAPS scores and corresponding student EOCT scores were high, but due to a lack of variability in the data, a significant positive relationship could not be shown. Teachers indicated positive attitudes toward differentiated instruction in the classroom and reported that areas of need for implementing differentiated instruction were resources and administrator support. The implications for positive social change include the potential to create stronger support systems (consisting of educators, students, parents, administrators, and the community) for differentiated education, in order to enhance student academic achievement.

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In the words of Calvin Coolidge:

> Nothing in this world can take the place of persistence. Talent will not: nothing is more common than unsuccessful men with talent. Genius will not: unrewarded genius is almost a proverb. Education will not: the world is full of educated derelicts. Persistence and determination alone are omnipotent.

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Chapter 1: Introduction to the Study

Standardized assessments have become a large part of public education, and the results of these tests are strong determinants for college admission and sometimes high school graduation. The state of Georgia introduced a classroom differentiation policy in 2007, requiring all educators to implement differentiated instruction in the classroom (Georgia Department of Education, 2015a). The policy came following the strict demands of the No Child Left Behind Act of 2001 (NCLB, 2002). NCLB required that all students pass statewide standardized tests and, more importantly, called for educators to bridge the gap between subgroups of students and provide instruction for students with Individualized Education Programs in the least restrictive environment (Ansell, 2011). Because of these demands, strategies to improve pedagogy and reach children of all abilities and socioeconomic backgrounds have been implemented; differentiated instruction is one of those strategies.

Differentiated instruction describes a pedagogical strategy implemented to reach students at different levels of learning (Watts-Taffe et al., 2012). In this instructional practice, teachers use varied methods and strategies to reach an array of students. Throughout the years, this form of instruction has been introduced in classrooms across the states and throughout the nation to replace the traditional, lecture-oriented classroom. The efforts of Ward (1961) focused on differentiated instruction in gifted classrooms, introducing the concept to education. The research by Vygotsky (1934/1986) based differentiation on a learner's zone of proximal development. Danielson (1996) contended

that an expert teacher was one who implemented differentiation; later researchers such as Huebner (2010) and Guskey (2014) confirmed that contention.

Researchers (e.g., Guskey, 2014; Tomlinson, 2005; Vaughn & Wanzek, 2014) have explored differentiated instruction and its effectiveness on student learning. Furthermore, their research provided the relationship between the implementation of differentiated instruction to one of the highlights of NCLB (2002): standardized assessments. However, to date, I could find no published research on quantifiable evidence of any relationship between differentiated instruction and subject-specific scores on statewide standardized assessments, the End-of-Course Tests (EOCTs).

In this chapter, I define and elaborate on the details of differentiated instruction. This study was designed to determine whether higher levels of differentiated instruction in Georgia high school classrooms are associated with student success on standardized EOCTs. In this chapter, I also outline the problem under study as well as explore the literature dedicated to differentiated instruction and classroom assessment.

Background

In a survey of members of the National School Board Association, Peifer (2014) indicated that the majority described the purpose of public school as to help students fulfill their potential. However, the Bush administration noted a major gap in the performance of children of different socioeconomic groups. One statistic leading to development of federal laws notably shared an achievement gap, or disproportionate scores between student groups, as large as a 32% between Black males and White males

in the eighth grade in math (Dalmia, 2007). This achievement gap was disconcerting for the nation and caused the administration to reauthorize the long standing Elementary and Secondary Education Act, which "provided federal grants to state educational agencies to improve the quality of elementary and secondary education" (U.S. Department of Education, 2015, para. 3). These grants included Title I funding designated for local education agencies with high percentages of low-income families. According to NCLB (2002), this section was designed to provide quality education (or ensure a fair and equal opportunity) for disadvantaged students.

The law's intent to decrease the achievement gap may not have been successful. The most recent data from the National Assessment of Educational Progress (2015) indicated 32% of White 12th graders scored proficient or better in mathematics, compared to 12% of Hispanic students and 7% of Black students. In reading, 46% of White students scored proficient or better, compared to 25% of Hispanic students and 17% of Black students (National Assessment of Educational Progress, 2015).

This reauthorization as NCLB initiated an increase in Title I funding and competitive annual reports of public schools (Klein, 2015). More importantly, NCLB (2002) called for schools to administer standardized tests to measure students' performance and ensure that schools were being held accountable for the learning taking place. In exchange for federal funds, states committed to annual standardized testing in math and science of students in Grades 3–8; the results reported from this test identified scores by race, gender, disability, and other categories (Dalmia, 2007). The aggregated

data from these assessments allowed state and local education agencies to get a snapshot of their schools' performance. Unfortunately, "many schools across the nation have rated schools as failing without developing adequate programming to help schools and students lacking the skills to pass these tests" (Cerre, Alsace, & Gilmartin, 2013, p. 359).

Parents and students in low-performing schools had the option to transfer to better schools or receive funding for additional tutoring (Guilfoyle, 2006; Laitsch, 2005). For school personnel, additional training in differentiated instruction was required to meet students' needs. Yet, very little evidence has been published indicating that teachers are effectively implementing differentiated instruction. Moreover, few, if any, definitive data or studies have correlated differentiated instruction with improved statewide standardized scores in Georgia.

Problem Statement

Spring (2009) emphasized the importance of NCLB, arguing that the embedded compassion in NCLB "place[d] great hope and confidence in public education" and how "our economy depends on higher and higher skills, requiring every American to have the basic tools of learning" (p. 102). Although the thread throughout Spring's text was that the policy change stirred and woke up the nation about the need for students to improve in math and science, the author continued to be critical of the nation's educational system.

Other critical arguments against NCLB soon arose, such as articles questioning the impact of NCLB on school culture (Guilfoyle, 2006). Through an analysis of the

achievement gap through the lens of testing, Guilfoyle (2006) argued that although the purpose of the law was to improve schools, the focus of the law on standardized testing changed the way students learned and teachers approached the classroom. With such a substantial focus on testing and improving testing scores, school district personnel have discovered ways to raise test scores without actually improving student mastery of subject matter (Guilfoyle, 2006). Yet, Guilfoyle contended that these flaws are one aspect of the law that has been explored and is being fixed. School systems in California, Boston, Rhode Island, and other areas have restricted the focus on assessment and are rather focusing on the difference in students and school environments (Guilfoyle, 2006).

Criticisms of NCLB were addressed with the most recent reauthorization of the law by President Obama as the Every Student Succeeds Act of 2015 (U.S. Department of Education, 2015). The more prescriptive, testing-oriented aspects of the law were revised to provide some flexibility for schools and students. However, the law retained expectations of accountability and high academic standards (U.S. Department of Education, 2015).

For some educators, the anticipated outcomes of NCLB have not occurred fast enough. In a review, Laitsch (2005) analyzed the criticisms of NCLB in Sunderman, Kim, and Orfield's book, *NCLB Meets School Realities.* One of the main concerns addressed in Sunderman et al.'s book (as cited in Laitsch, 2005) was test accountability, with the authors recognizing the possibility for large school failure under the auspices of NCLB through an in-depth study of at least six states. Laitsch's review explained schools

and educators as strained over test results. Laitsch contended that Sunderman et al.'s argument had validity, but noted the data were limited to the condition of schools in large urban areas. Laitsch (2005) stated, "The study focuses primarily on large districts and metropolitan urban and central-city areas with high minority and high poverty enrollments, leaving some of the concerns of rural districts and states largely unaddressed" (p. 1).

Whereas these authors focused on the comparison of public schools by geographic location, other researchers (i.e., Carnoy, Jacobsen, Mishel, & Rothstein, 2005; Dobbie, Fryer, & Roland, 2013) compared charter schools to public schools, indicating that charter schools use a differentiated approach. Yet, little data have supported that differentiated instruction has any effect on student success on tests. Rather, a qualitative research study by Dobbie et al. (2013) found, "Frequent teacher feedback, the use of data to guide instruction, high-dosage tutoring, increased instructional time, and high expectations" were factors attributed to charter school success (p. 28).

My findings from an in-depth examination of the literature supported the idea that success may not be attributable to the pedagogy of differentiated instruction. Carnoy et al. (2005) compared instruction practices of public schools to those of charter schools and concluded that charter schools have not demonstrated as large of an improvement as originally assumed. Carnoy et al. contended that one of the main factors that charter schools impute success to is the limited bureaucracy affecting hiring and teaching practices, which is considered an element that stifles creative education improvements.

Contrarily, Carnoy et al. did argue that parental background, school choice, and educational experience all play a role in students' success. Carnoy et al. not only did not advocate for one educational model or the other, but also did not promote a specific pedagogical approach. The authors emphasized the importance of educational flexibility on the success of the student. Differentiated instruction can be one of those pedagogical approaches, but the flexibility to find those additional strategies also should be accepted in the public school sector.

Current literature on educational models identified various concerns of educators, schools, and politicians for improving schools, testing, NCLB, and charter schools (Carnoy et al., 2005; Frankenburg & Lee, 2003; Guilfoyle, 2006; Laitsch, 2005). The research indicated alternatives to public schools, as well as failed schools. However, the research did not pinpoint specific data supporting differentiated instruction as a determining factor for success on standardized assessments.

Purpose of the Study

The lack of data on a possible relationship between differentiated instruction and student success on standardized assessments provided the basis for additional research. The purpose of this quantitative study was to fill this gap by determining whether a significant relationship existed between levels of differentiated classroom instruction and 11th-grade student scores on the EOCT standardized assessments. In 2007, the Georgia Department of Education introduced differentiated instruction statewide. The Georgia Teacher Assessment Performance Standards (TAPS) specifically include differentiated

instruction as well as a rubric for measuring its implementation (Georgia Department of Education, 2014). However, to date, few, if any, studies have investigated whether higher levels of differentiated instruction in Georgia high school classrooms are associated with an increase in student scores on the standardized EOCTs.

Research Questions and Hypotheses

In this study, I examined the relationship between differentiated instruction and the academic performance of 11th-grade students attending a Georgia high school. Specifically, I examined if there was a statistically significant relationship between the independent variable of teacher level of differentiated instruction as measured by the TAPS and the dependent variable of 11th-grade student scores on the EOCT. In alignment with the research problem and purpose, I developed the following research questions to guide this study:

Research Question 1: What is the relationship between teacher score on the TAPS differentiated instruction rubric and 11th-grade student scores on the EOCT in the teacher's classroom?

$H1_0$: There is no statistically significant relationship between teacher TAPS rubric score and 11th-grade students' score on the EOCT.

$H1_A$: There is a statistically significant positive relationship between teacher TAPS rubric score and 11th-grade students' score on the EOCT.

Research Question 2: What is the relationship between teacher perception of differentiated instruction and teacher TAPS rubric score?

$H2_0$: There is no statistically significant relationship between teacher perception of differentiated instruction and teacher TAPS rubric score.

$H2_A$: There is a statistically significant positive relationship between teacher perception of differentiated instruction and teacher TAPS rubric score.

Research Question 3: What are the barriers to fully implementing differentiated instruction?

Theoretical Foundation

Since the inception of NCLB in early 2002, student performance in math and science has seen a significant decline. Student reading performance also has declined since NCLB. According to Spring (2009), American high school students consistently have scored lower than students in other parts of the world. School systems and educational experts have made avid attempts to change the pedagogy to move learning forward. The modern concept of differentiation (Watts-Taffe et al., 2012) is another move towards improving pedagogy and erudition; however, mastering the concept of teaching is more than learning about visual, auditory, and kinesthetic learners.

Differentiated instruction provides flexibility in instruction, allowing teachers to plan and execute alternative approaches to content presentation, process, and production that responds to the different ways that students learn based on readiness, interests, and needs (Tomlinson & Imbeau, 2014). Teachers who demonstrate differentiated instruction better reach students and help students apply subject matter to learning assessments

(Spring, 2009). Fulfillment of the goals of NCLB calls for educators who not only assess students but also consider the methods used to achieve those goals. As the state of Georgia has leverage for the implementation of differentiated instruction, it is important to understand its relationship with student achievement.

Nature of the Study

I used a quantitative, correlation design for this study. Quantitative studies examine statistical variables to determine critical relationships, meanings, and suggested characteristics (Gay & Airasian, 2001). Correlational research is a quantitative method of research in which there are two or more quantitative variables from the same group of subjects, and the researcher is trying to determine if there is a relationship (or covariation) between the two variables—a similarity between them, not a difference between their means (Howell, 2004). This design was appropriate because it served the goal of the study. The independent variable for this study was teacher level of differentiated instruction, operationalized as the TAPS differentiated-instruction rubric score. The dependent variable was classroom average 11th-grade student score on the EOCT.

Definitions

Academic performance: In this study, academic performance was measured as student score on the EOCT.

Differentiated instruction: This pedagogical strategy is based on varied instruction to meet the needs of students of all levels. Differentiated instruction occurs

through research-based strategies and methods, including "vigorous attempts to meet students where they are in the learning process and move them along as quickly and as far as possible in the context of a mixed-ability classroom" (Tomlinson, 2000, p. 25). Successful preparation for differentiated instruction relies on content, process, product, and environment (Tomlinson, 2000).

End-of-Course Tests (EOCTs): Georgia's standardized measure of student proficiency is administered to 11th-grade students in literature, biology, geometry, and history. EOCTs were the measure of academic success in this study.

Observation: Monitoring behavior, actions, and practice in the natural environment is observation. This act is performed by an observer who does not participate in the setting and who has minimal to no effect on the natural practices of the members being observed. Observation "focuses on how teachers teach and how students respond to the instruction" (Newman & Singer, 2012, p. 10).

Standardized assessment: Any evaluation used to measure and compare the collective knowledge base of an individual and a group of students is a standardized assessment. This assessment may be project based, written, computer based, or any other standard measurement that is rational in measuring all students against the standards that are required for their age group. Popham (1999) defined a standardized assessment as "any examination that's administered and scored in a predetermined, standard manner" (para. 2). The standardized assessment in this study was the Georgia EOCTs.

Teacher Assessment Performance Standards (TAPS): Georgia TAPS include tools to measure each area of teacher competence. The tool used in this study was the TAPS rubric for differentiated instruction (see Georgia Department of Education, 2014). This rubric is used to evaluate teachers and observe classroom instruction. The complete TAPS tools evaluate professional knowledge, instructional planning and strategies, learning environment, assessment strategies and uses, professionalism, differentiation of instruction, positive learning environment, academically challenging environment, professionalism, and communication. The rubric is used throughout Georgia to align teaching practice with expected performance standards using the terms exemplary (Level IV), proficient (Level III), needs development (Level II), and ineffective (Level I). Each item on the rubric receives a score of 0 for Level I, representing no use of knowledge of the practice; 1 for Level II, indicating inconsistent practice; 2 for Level III, indicating consistent demonstration of the practice and needs of students; and 3 for Level IV, indicating continual use of content and pedagogical knowledge (Georgia Department of Education, 2014).

Assumptions

I assumed that student scores on the EOCTs were an accurate reflection of student achievement. I assumed that the TAPS rubric was a valid assessment of differentiated instruction. Finally, I assumed that participating teachers would be honest in completing the surveys.

Scope and Delimitations

I examined the level of differentiated instruction in each classroom and the average 11th-grade student score on the EOCT in each classroom. The research occurred in an urban area in Georgia. The scope of this study was delimited by the sample, which only included full-time teachers of core subject areas in one Georgia high school. The scope of this study was also delimited by the timeframe, which was restricted to the fall semester. Another delimitation was the measures, which only included TAPS rubric scores and data regarding student scores on the EOCTs in literature, biology, geometry, and history. Additional data included survey data regarding teacher views of differentiated instruction. The final delimitation was my focus on only a small group of 11th-grade teachers and students in a single high school. Because of the small study sample, the results may not be generalizable to other populations, other grade levels, and other geographical areas; however, they can provide a foundation for further research.

Limitations

This study was limited by the sample, which was modest in size and might not be representative of other high schools in Georgia. Another limitation was the measures because the survey data were self-reported, which might be susceptible to socially desirable responding, in which subjects respond in a way they think the researcher desires (see Kaminska & Foulsham, 2013; Krosnick, 1999). However, socially desirable responding can be reduced by making surveys anonymous (Dodou & de Winter, 2014), or confidential, as I did in this study. The last limitation I identified in this study was the

design, which was cross-sectional in nature and therefore not sensitive to changes over time. In totality, the generalizability of the study and, by extension, its duplication were compromised; however, findings from this study could lead to future research and other similar paradigm-based analysis.

Significance

Despite NCLB, significant gaps remain in student achievement not only within the United States but also between American students and their international peers (Spring, 2009). As a global society, competition for jobs is an international problem that will leave American students at the bottom of the selection process. The focus on standardized testing may appear to offer a level playing field to assess student achievement, yet standard instruction does not consider individual student ability. One result of NCLB was Georgia implementing differentiated instruction statewide; however, to date, few, if any, studies have investigated whether higher levels of differentiated instruction in Georgia high school classrooms are associated with higher student scores on the standardized EOCTs. Therefore, I tested the effectiveness of differentiated instruction in a Georgia high school in this study.

This study is significant because it helped fill this important gap in the published literature by assessing the relationship between levels of differentiated instruction in classrooms and student scores on the EOCTs in literature, biology, geometry, and history in a Georgia high school. In the study, I connected the state's focus on instruction with the common goal of differentiated instruction and educational practices across the nation

as a means to close the achievement gap. I employed the state TAPS rubric for differentiated instruction. There is a need in the field to identify specific strategies that have a relationship with the success of students, providing a platform for future research and basis for teaching practices. Positive social change was promoted in that this study provided empirical evidence regarding the efficacy of differentiated instruction, influencing theory, practitioners, and governmental agencies regarding the allocation of scarce resources to improve student achievement and learning outcomes.

Summary

The enactment of NCLB created an emphasis on standardized test scores that school systems endeavor to meet without consideration to how and the level that students are able to apply the material. The aftermath of NCLB is the integration of standardized testing as a significant aspect of public education and its practices. According to the literature, Georgia has implemented differentiated instruction to help students perform well on these assessments. In addition, the state has dedicated training and implemented evaluation tools—the TAPS—to measure teachers on how well differentiated instruction is implemented in the classroom (Georgia Department of Education, 2014). However, little, if any, evidence has been presented that level of differentiated instruction in the classroom has a significant effect on student performance on the state standardized EOCTs. In Chapter 2, I outline the existing literature and research on differentiated instruction, the conceptual framework for this study, and the gap in research.

Chapter 2: Literature Review

NCLB (2002) was a policy and call to action to close the achievement gap through teaching and standardized assessments for students in reading and math in Grades 3–8 and in high school. In 2007, the state of Georgia answered the call of NCLB with a training that introduced differentiation as a way of teaching in the classroom. However, to date, no studies have investigated whether higher levels of differentiated instruction in Georgia high school classrooms are associated with higher student performance on the 11th-grade EOCTs in literature, biology, geometry, and history. The purpose of this study was to fill this gap in the published literature by determining whether there was a significant relationship between levels of differentiated instruction in classrooms and corresponding 11th-grade students scores on the EOCTs in literature, biology, geometry, and history in a Georgia high school. In this chapter, I review the extant literature on the theoretical foundation of differentiated instruction, the impact of differentiated instruction on students, the teacher's role in differentiating instruction, and the impact of differentiated instruction on grading.

Literature Search Strategy

In this literature review, I focused on the earliest research on differentiated instruction to the most current research. To locate literature, I searched the ERIC, ProQuest, and EBSCO databases, accessed through the Walden University Library and also directly. These databases were excellent sources for obtaining peer-reviewed articles. Additionally, I used the Google Scholar search engine to locate specific and general

sources. The key terms used, in combination and alone, to narrow the search were *differentiation, classroom differentiation, grading, differentiated instruction, teacher efficiency*, and *standardized assessments*. Research was gathered from empirical evidence and peer-reviewed, published literature. I also used references in the collected articles to locate additional sources. Although I initially limited my search to peer-reviewed articles from 2011–2017, this date restriction was removed for pertinent information that addressed the theoretical framework and literature review related to key concepts and variables.

Theoretical Foundation

Differentiated instruction is an approach grounded in Vygotsky's theory of sociocultural learning, including the key concept of the zone of proximal development (Konstantinou-Katzi, Tsolaki, Meletiou-Mavrotheris, & Koutselini, 2013). The zone of proximal development is a level of challenge for the student in which the student still needs some support from the teacher for success (Konstantinou-Katzi et al., 2013). Support is gradually removed until the student can accomplish the task alone through a process called *scaffolding*. To achieve meaningful learning, students need teacher scaffolding, collaboration with peers, and tasks that are just beyond the comfort level of the students (Konstantinou-Katzi et al., 2013). The goal of differentiated instruction is to educate the individual learner (Parsons, Dodman, & Cohen Burrowbridge, 2013; Tomlinson, 2005; Ward, 1961). Ward (1961) originally shaped differentiated instruction

around teaching the gifted learner. Over time, general education began to adopt the concept, despite resistance from some educators (Delisle, 2015).

Implementation of differentiated instruction occurs when a student's ability is assessed (i.e., reading ability, current level, learning capability) and lessons tailored based on the result of the assessment (Delisle, 2015). In gifted or general settings, students are on various levels, requiring additional examination and research by the instructors to ensure that students are taught based on their learning styles and adaptive needs (Logan, 2011). This detailed needs assessment for differentiated instruction—the requirement to investigate each student before disseminating a lesson—is what some educators find unattractive (Delisle, 2015). Successful preparation for differentiated instruction relies on content, process, product, and environment (Tomlinson, 2000). Tomlinson (2000) referred to content, process, product, and learning environment as the elements of differentiation based on readiness, interest, and learning profile.

Content is what students learn and how they access the information. Although standard information is required to be covered in the classroom, the teacher plays a vital role in how this information is presented to students. Teachers can vary the delivery of this content, in both visual and auditory methods (Tomlinson, 2000; Wu, 2013). The process, however, considers activities used to achieve mastery, which may include a length of time, agendas, formative assessments, and standardized assessments (Tomlinson, 2000; Wu, 2013). The process, in turn, affects the resulting product, which may be test scores, a project, a video, or a presentation. The learning environment is the

prominent element that determines how students learn and the feel of the classroom. Some students need movement, different seating arrangements, silence, or other meaningful aspects that make the classroom conducive to learning (Tomlinson, 2000; Wu, 2013). Rather than a linear classroom with desks and chairs neatly lined up in rows, many students excel in an environment that allows for students to move about, whereas others learn better sitting quietly (Tomlinson, 1995, 1999).

Literature Review Related to Key Concepts and Variables

Ward (1961) defined the concept of differentiated instruction as individualized instruction based on each student's ability. Tomlinson (2000, 2005) expanded this definition, applying differentiated instruction techniques to mixed-ability classrooms. The goal of differentiated instruction is to provide each student with the opportunity to maximize his or her learning experience by utilizing the tools and methods best suited for their learning needs (Ward, 1961).

Multiple perspectives exist concerning the impact of differentiated instruction and its perceived benefits or setbacks. Researchers have detailed how to meet the needs of low learners and advanced learners and the effects of mixing instruction methods on educators and the classroom (Hamdan & Mattarima, 2012). Other researchers dissected the relationship between assessment and differentiated instruction or the lack thereof. Each type of research is an important component to a full understanding of this topic.

Differentiated Instruction

George (2005) studied the topic of logic and the understanding of differentiated instruction to explain the need for differentiation versus homogeneous classrooms. George suggested that the nature of heterogeneous classrooms prepare students for life after school, making them more prepared for real-world situations. Just as students learn in schools how to work with others of different abilities and talents, the same applies for teachers. George further implied that the mixed classroom allows teachers to be aware of students' individual needs and maximize learning opportunities. The author insisted that differentiation is an effective tool for all learners, regardless of handicap or advantage. The ability for students to recognize their abilities and discover personal resourcefulness in the classroom empowers them to be successful. More importantly, the teacher is able to teach students to work and learn at a different pace; however, George recognized the time and effort required to implement strategies.

Tomlinson (2000) also asserted that although differentiated instruction is a necessary approach to teaching, implementation is complex and requires effort. The researcher suggested practices and examples of how other school systems have made the practice work. According to Tomlinson (2000), administrator support is a necessary component of a successful implementation of differentiated classroom instruction. Principals and assistants are catalysts for ongoing conversations about differentiation instruction (Guskey, 2014). Comprehension and buy-in of the rationale and necessity of differentiated instruction are also key to its full application in the institution's instruction

model (Tomlinson, 2000). Furthermore, these leaders should have access to resources to support instruction. Tomlinson (2000) also suggested that schools nurture teacher models and coaches and provide staff development and model differentiation in practice, accepting different ideas viewpoints and approaching problems with multitiered ideas. Tomlinson (2000) offered effective methods toward implementation of differentiated instruction.

Conversely, studies have offered evidence that differentiated instruction is not a definite key to success. Wormeli (2012) stated that educators must engage in various forms of professional development to meet the needs of students. For educators, the classroom is a complex environment, and teachers must meet the needs of a diverse group of learners (Gormley & McDermott, 2014; Smit & Humpert, 2012; Subban & Round, 2015). Niño Santisteban (2014) conducted a study on the impact of literacy and foreign language on students that included eight children affected by detrimental life issues including violence, familial issues, and cognitive impairments. Differentiated instruction improved these students' writing but had no impact on their reading comprehension (Niño Santisteban, 2014).

Several studies have evidenced the use of differentiated instruction as an early intervention for readers of young age or varied abilities (Denton, 2012; Vaughn & Wanzek, 2014). In a longitudinal study conducted by Connor et al. (2013), differentiated instruction provided additional assistance to struggling readers. The population for their study was students in Grades 1–3 receiving individualized reading instruction and

compared to a treated control group over time. Each general education teacher involved in their study was trained on differentiated instruction before engaging in the study. The results revealed that students with individualized or differentiated instruction proved to be stronger readers after the 3rd year of instruction (Connor et al., 2013). The implications from their study are that differentiated instruction may result in increased achievement, at least among younger students. This sentiment would be shared by researchers of students with disabilities who have made this statement for more than a decade (i.e., Vaughn & Wanzek, 2014).

Solis, Vaughn, Swanson, and Mcculley (2012) indicated that providing meaningful education to students with disabilities required a high degree of cooperation between teachers and other school personnel. Through meta-analysis, Solis et al. sought to identify the best collaborative teacher process to improve student outcomes. Although many researchers have referenced the need for differentiated instruction for students with disabilities (e.g., Denton, 2012; Ernest, Heckaman, Thomson, Hull, & Carter 2011; Tomlinson, 2014), clarification is needed on how collaborative teaching influences differentiated instruction. Solis et al. examined and synthesized quantitative and qualitative data through a systematic, iterative process of sieving, cross-referencing, and inquiry. Their results revealed that in addition to planning time, teachers needed resources, positive attitudes, and training.

Rock, Gregg, Ellis, and Gable (2008) offered a more detailed option to handling differentiated instruction. The authors examined the different instructional methods

between a traditional teacher and a special education teacher and further examined the theoretical framework of differentiated instruction and the associated literature. Rock et al. discovered that 96% of teachers labeled general education teachers with general education classrooms reported having students with learning disabilities in their classrooms. Additionally, they found that learning disabilities are not teachers' only classroom concerns; teachers also must manage socioeconomic differences and social and cultural backgrounds. Cookie-cutter instruction techniques are not effective in teaching an array of students and the histories they bring with them to the classroom (Rock et al., 2008).

Research on differentiation has proven that simple approaches, such as flexible grouping, increased self-selected reading time, and access to various reading materials, are effective (Rock et al., 2008). The five steps of the reflect, evaluate, analyze, craft, and hone framework emanate from seven basic beliefs and four guiding principles for implementing differentiated instruction (Rock et al., 2008). The five steps as outlined by Rock et al. (2008) are:

1. Reflect on will and skill. This step calls for teachers to assess their current knowledge base and common practices.
2. Evaluate the curriculum. Teachers organize standards and plan for instruction.
3. Analyze the learners. Teachers should know where students are academically by assessing their learning needs and grouping students to achieve curricular goals.

4. Craft research-based lessons. Teachers should consider using evidence-based practices that will work for their students.
5. Hone in on the data. The most effective part of the instruction is to understand the results. Teachers can use an electronic database, teacher tools, and assessment instruments to aggregate information for student learning.

Huebner (2010) furthered the research for differentiated instruction by compiling a list of research-based practices. Huebner explained that based on current research, differentiated instruction has proven to increase students' scores and reach both gifted and deficient learners. More importantly, just like differentiation, Huebner posited that there is no one-size-fits-all model. The five-step strategy described by Rock et al. (2008) is efficient, but other effective ways exist to implement differentiated instruction, based on existing knowledge, interest, and individual student abilities (Huebner, 2010). Other strategies for differentiated instruction may include flexible grouping, ongoing assessment, project-based learning, along with a multitude of strategies to reach individual learners. What is most important is that teachers create a model where students increase their learning capabilities.

Research Studies on Differentiated Instruction

Researchers increasingly have reported evidence of positive effects of differentiated instruction. In a recent study, Valiandes (2015) concluded that students made better progress in classrooms where differentiated instruction methods were systematically employed, compared to students in classrooms where differentiated

instruction methods were not employed. Based on the findings, the quality of differentiated teaching being given by the teacher had a great effect on students' achievement as well as the systematic employment of differentiated instruction methods.

Konstantinou-Katzi et al. (2013) found differentiated instruction effective in improving students' performance as well as in enhancing motivation and engagement. Differentiated instruction applied to engineering students in college-level mathematics showed a positive impact on student learning and attitudes towards mathematics. Based on the observations of the researchers, the whole class was transformed, becoming more interactive and lively in student participation throughout the semester when differentiated instruction was applied.

Dosch and Zidon (2014) explored the implementation of differentiated instruction in higher education to understand if quantitative improvements were noted in a classroom with differentiated instruction compared to a classroom with non-differentiated instruction. The study was conducted in two different sections of the same Educational Psychology course taught by the same instructor. Findings showed the group participating in differentiated instruction significantly outperformed the nondifferentiated group in the combined assignments and the exams (Dosch & Zidon, 2014).

Teacher Roles

Differentiated instruction allows teachers to implement various methods to anticipate and prepare lessons to reach the learning differences among students (Ruys, Defruyt, Rots, & Aelterman, 2013). As evidenced in the study by Dixon, Yssel,

McConnell, and Hardin (2014), teacher efficiency was correlated with a greater degree of professional development. Teachers with more training demonstrated differentiated instruction with ease (Chien, 2012; Dixon et al., 2014; Tobin & Tippett, 2014).

Robinson, Maldonado, and Whaley (2014) investigated how teacher participants from an elementary school, a middle school, and a high school successfully differentiated instruction. Teachers' understanding and knowledge in a differentiated classroom were crucial in achieving student success. The interviews explored participants' perceptions of how differentiated instruction influenced their ability to meet the diverse needs of learners in their classrooms. Major findings in the case study included positive aspects of how differentiated instruction meets the needs of all learners and the belief that differentiated instruction is essential for student success. Obstacles were a lack of professional development, time constraints, and the difficulty of learning how to initially implement differentiated instruction (Robinson et al., 2014).

Findings in additional studies have evidenced the effectiveness of such training in higher education (Dosch & Zidon, 2014; Joseph, Thomas, Simonette, & Ramsook, 2013; Konstantinou-Katzi et al., 2013). Whereas Konstantinou-Katzi et al.'s (2013) findings were content specific, Dosch and Zidon (2014) identified the large diversity of postsecondary students and identified that differentiation was a teacher mindset. In fact, a study by Joseph et al. (2013) examined the use of differentiated instruction in postsecondary institutions, identifying that educational institutions must implement supportive effective teaching and modeling of differentiated instruction for the method to

be successful. Through a series of data collection including focus group interviews, questionnaires, and student reflections, the evidence revealed differentiated instruction as most beneficial for the vast majority of student teachers (99%), who conveyed a willingness to experiment with differentiated instruction in subsequent practicum sessions. Joseph et al. also found that 88% of student teachers expressed a desire to use a differentiated instructional approach in their classrooms upon graduation.

A strikingly different study conducted by Seidel, Blomberg, and Renkl (2013) revealed the effectiveness of audio-visual aids as a differentiated strategy for teacher candidates. The authors investigated the effect of experiential findings of two instructional strategies on predetermined learning outcomes in video-based learning environments. In the first, rule was presented, followed by an example. In the second, an example was presented, followed by the rule. Fifty-four teacher candidates with similar prerequisites were selected for the study. Whereas the video clips and initial experience was the same, the actual teaching component was unique. Participants were provided the rules and then the examples, or the examples were given first and then the example questions. The results indicated learners in the example-first group identified more challenges in total and that a higher proportion of these challenges were situational (Seidel et al., 2013). The study indicated that the manner in which teachers implement differentiated instruction can greatly determine student outcomes.

Another study by Tomlinson (1999) explained the teacher's role in differentiated instruction through two very different classroom settings. In one classroom environment,

students had very little input and the teacher mostly lectured. In the second classroom environment, students received graphic organizers and engaged in the learning environment by wearing togas. Tomlinson (1999) used these examples to emphasize a student engagement as a key component of differentiated instruction, demonstrating that student understanding and student engagement are both necessary for effective teaching. Tomlinson (1999) offered a third element necessary for effective instruction: allowing students to be a part of the lesson, choosing characters that interest them, collecting data, and working in groups. The teacher found a way to engage students through whole-group and small-group instruction.

Birnie (2015) dispelled misconceptions about differentiated instruction, highlighting the importance of the differentiated strategy and how the teacher plays a vital role in the success of its implementation. Birnie argued that effective teachers also address individual student needs and interests as a means to assist in each student's success. This statement aligns with Tomlinson (2014), who argued that the one-room school teacher is the epitome of differentiated instruction, providing evidence of successful learning scenarios and identifying appropriate instruction adjustments for age and intellect that teachers of earlier days had to make.

Tomlinson (1999) furthered the idea that the teacher should find a way to engage students. Teacher decision-making and practice greatly affect how students learn (Watts-Taffe et al., 2012). In an examination of school-level and district-level differentiated instruction, Tomlinson (1999) recommended how teachers can develop differentiated

instruction and how leaders can support those efforts. According to Tomlinson (1999), leaders first should develop a clear understanding of differentiated instruction. This enables leaders to model and provide explicit instruction to teachers. More importantly, leaders must serve as coaches to help leaders develop their capacity in various differentiated instructional strategies.

A study conducted by Sternberg and Zhang (2005) suggested that differentiated instruction is subject to style preferences of the instructor. The authors used the theory of mental self-government to explain teaching styles. The theory suggested that self-governance of a teacher is a reflection of characteristics of the individual. The study identified an individual by three different functions: the learner as legislative (analytical, anticipatory), executive (creative), or judicial (evaluative). The researchers also identified four forms of mental self-governance that dictate how teachers and students function in classroom environments: monarchic, hierarchic, oligarchic, and anarchic. These two forms of mental governance are polar opposites—individuals as stuck in their ways (monarchic) or disorganized and creative (anarchic). Both mental governance theories dictated how these teachers implemented differentiated instruction and supported the concept of pairing types of teachers with age groups. After several subsequent studies, Sternberg and Zhang concluded that students perform better when their mental governance matches with their teachers'. Therefore, the current study put more focus on the role that the teacher plays in differentiated instruction.

Levy (2008) examined the role of the teacher in providing differentiated instruction. Levy, through descriptive terminology, provided a distinct image of the makeup of the classroom and the students. Students in the classroom are from different backgrounds and have different instructional and emotional needs and learning experiences. Further, students are different not because of their needs but because of the teacher. Levy argued that the variance in learning among underprivileged students and other students was not due to intellectual differences among students, but rather teacher expectations of those students. Levy posited that every teacher has the capability to differentiate instruction and has done so in some way. The role of the teacher is to discover what method or strategy will work best with the students. Content, process, and the subsequent product are necessary to understand the curriculum, define how it is taught, and help students demonstrate what they have learned. Through formative assessments (ongoing assessments throughout a lesson), summative assessments (assessments at the end of a lesson), or even preassessments, teachers are able to assess students' ability, monitor progress, and adjust instruction accordingly.

Differentiated Instruction and Grading

Tomlinson (2005) attempted to clarify the meaning of grading in differentiated instruction. The important stance made was that grading and assessment were meant to serve two different purposes. Grading provides a conclusion about student achievement. According to Tomlinson (2005), the role of grading in differentiated instruction is that grades are based on criteria; grades should not be normative; and grading is subject to

error, such as extraneous factors that impede success. Due to these possible errors, many educators are concerned with how differentiated instruction and grading, which is necessary to assess student progress in the current school system, can align. Differentiated instruction provides vehicles for students to learn via different pathways and helps students achieve mastery of material through multiple modes of learning (Heacox, 2012). Although the relationship between grading and differentiated instruction is complicated, grading is necessary; an overhaul of the current reporting system would better account for student success (Tomlinson, 2005, 2013).

The development of alternative reporting systems is a complex undertaking. A quasi-experimental analysis by McQuarrie, McRae, and Stack-Cutler (2008) on projects geared towards student learning identified and analyzed effective teaching practices. Modern classroom environments are complex, and instruction is shaped by and through the culture, gifts, talents, and abilities of the students. Using this knowledge, 25 schools restructured techniques for instruction. Analysis showed effective pedagogies consider the overall classroom environment and the background and abilities of the students and thrive when there is comprehensive support from teachers and administrators (McQuarrie et al., 2008). For differentiated instruction to be successful, it must have support and be shaped around ongoing assessment for learning.

Ernest et al. (2011) engaged in an in-depth case study to examine how a beginning teacher utilized assessment. The master's candidate student-teacher used teacher-candidacy requirements, assessments, and other strategies from the four

differentiated instructions to create lesson plans that enhanced students' learning. Preassessment, self-assessment, and reflection of the process provided data-driven evidence that differentiated instruction benefited students. Journals from students indicated a clear and specific understanding of objective, where the subjects noted that differentiated instruction helped to bridge the gap and meet the individual needs of all the student in an inclusive setting (Ernest et al., 2011).

Moon (2005) elaborated on the role of the assessment, its stages, and importance in differentiated instruction. Although all students must reach the same end goal, how that process happens is different for each student. The role of the teacher is to ensure that assessment accurately measures students' progress. Moon noted, "A key principle of differentiation is that all students are moving toward the same instructional objectives. . . . Others will move with more foundational tasks or tasks structured with greater support mechanism" (p. 231). To discover the support mechanisms necessary to help students grow, assessment is necessary. Moon's research further supported how assessment is a key component of differentiated instruction.

Using student and teacher focus groups, self-reporting instruments, observations, and interviews, Tieso (2005) highlighted the support mechanism in a qualitative study with 31 math teachers and 645 students. Students were placed in heterogeneous performance-based groups and taught using a differentiated curriculum. Students were given a preassessment and postassessment to test the effectiveness of the differentiated curriculum. Results indicated that students showed improved scores on postassessments.

Results from Tieso's study further indicated that teachers and their students preferred the between- and within-class grouping arrangements to their typical whole-class grouping plan. However, Tieso's conclusions did not directly tie the differentiated curriculum to student performance without accounting for extraneous variables of change.

One such variable is the field of gifted education, which is known for work in introducing innovative instructional practices in classrooms (VanTassel-Baska, 2012). The question that VanTassel-Baska (2012) attempted to answer, however, was to what extent. In an attempt to identify the extent that gifted education impacts differentiated education, VanTassel-Baska examined a tool for measuring teachers' use of differentiation in the classroom, the Classroom Observation Scale–Revised. Differentiated instruction is one of many strategies measured using the scale. The form was designed after observation and study differentiated instruction. VanTassel-Baska (2012) stated, "The analyses in three studies showed that, overall, the scale was highly reliable (α = .91 - .93). The subscale reliability for all the clusters averaged above .70" (p. 47). Use of the Classroom Observation Scale–Revised led researchers to the conclusion that teachers were not necessarily differentiating instruction at a high level. Evidence of lack of brainstorming and metacognition indicated that additional professional development for teachers was necessary.

Doubet (2012) highlighted this role in an article describing a principal who used a redirected approach towards formative assessment to help teachers identify with differentiated instruction. The principal's objective was to avoid the misconceptions of

differentiated instruction. Teachers were accustomed to providing students with chunks of information and therefore were not as apprehensive to embrace the various ways to assess students' progress. In the end, the teachers began to develop a sense of understanding and found themselves implementing the strategies of differentiated instruction.

Yet Fenwick (2012) presented an alternate perspective to performance assessment and differentiated instruction in a study of three public schools in Australia's North Territory. Examination of the school district revealed low-income or low-achieving students received less quality instruction (Kalogrides & Loeb, 2013). Fenwick examined a reformed curriculum to designed to meet the needs of low and high socioeconomic status students. The teachers in Fenwick's study tailored their instruction to ensure that students met the minimum standards to complete courses. However, Fenwick noticed that as teachers continued to assess students through the year, their preconceived bias caused further disparity integrated into the curriculum. The curriculum was adjusted to the lowest variation of the English curriculum for two of the three schools.

Baumgartner, Lipowski, and Rush (2003) studied a reading program through a similar format to Tieso (2005). Baumgartner et al. used differentiated instructional strategies such as flexible grouping in two schools in one school district to improve students reading. Student and teacher surveys offered insight into the effectiveness of various reading strategies. Pretests indicated student reading levels; 31% of second-grade students were reading 31 words a minute. Results showed that students improved range

of reading strategies in both the middle and primary school as well as a 9% enhancement in the number of students who could read more words in a minute. Yet, the results from Baumgartner et al.'s study did not reflect how these students performed on standardized assessments or how extra factors played into the students' development.

However, a similar study by Little, McCoach, and Reis (2014) did account for some factors such as gender, school setting, age, and race. Little et al. sought to identify ways to improve reading fluency and comprehension at the middle school level. The authors identified the Schoolwide Enrichment Model–Reading Framework as grounded in a hypothesis that "starting in an area of interest, providing related reading materials at challenging levels, and differentiating instruction through reading conferences, achievement can be raised as well as it can encourage higher engagement in reading" (Little et al., 2014, p. 386). The results of the research were based on two treatment schools and two control schools. Within the target population, two treatment schools and two control schools, Little et al. found that the control schools, which did not receive professional development, scored 1.59 points lower on reading fluency tests. However, when not accounting for gender, race, and other differences, only one of the treatment schools showed a significantly positive difference (Little et al., 2014).

A study conducted by Graham (2009) also used control and treatment groups at the high school level. Graham analyzed the difference between schools with mandated differentiated instruction and those without using a mixed methods approach that identified how students performed on the former EOCTs prior to differentiated

instruction and after. The qualitative portion of the study determined how teachers and students perceived the effects of differentiated instruction on their teaching and learning. The results of Graham's study revealed no statistically significance difference between the passing rates among high school students on the Georgia EOCTs for students who attended a school where differentiation was mandated and those who attended a school where differentiation was not mandated. Furthermore, qualitative results revealed mixed feelings about implementing differentiated instruction. The results of Graham's study revealed how early mandates on standardized testing affected students and teachers. This study will extend that research, identifying whether higher levels of differentiated instruction correlate with success on the EOCTs.

Summary and Conclusions

The role of differentiated instruction in education is not without some controversy. Each adolescent brings his or her background, biographies, experiences, views, perceptions, emotions, habits, and journey into knowing self and others (Valiandes, 2015). There is no ultimate formula or one-size-fits-all solution when learning how to work with adolescents. A review of existing literature not only revealed background information about differentiated instruction but also highlighted the importance of using differentiated instruction to measure student achievement. According to the literature, the most important aspect of differentiated instruction is student results (Moon, 2005; Morgan, 2014; Ward, 1961).

According to Huebner (2010), differentiation increases students' scores. However, other researchers have claimed many of the ties to effective differentiated instruction have to do with teacher training and implementation (Joseph et al., 2013; Rock et al., 2008). Research tied directly to grading considered the factors of student growth, teacher implementation, and varied assessments to be extraneous factors playing a role in how students perform on any assessment (McQuarrie et al., 2008; Moon, 2005; Tieso, 2005; Tomlinson, 2005), still leaving a gap for literature on the effects of differentiated instruction and standardized test success. In the subsequent chapter, I detail the process for measuring differentiated instruction in the classroom. In addition, in Chapter 3 I explain the design and data collection and analysis of the current research.

Chapter 3: Research Method

Given the importance of passing statewide, standardized tests as well as the emphasis the state of Georgia has placed on differentiated instruction, it was appropriate to determine whether a relationship existed between levels of differentiated instruction in classrooms and 11th-grade student scores on the EOCTs in literature, biology, geometry, and history. In this chapter, I outline the research design and approach to this quantitative study. In addition, I provide information regarding the participants, analysis, validity, and ethical procedures in this study.

Setting

I conducted this study in a Georgia public high school with 80 teachers and a current enrollment of 1,300 students. Over 95% of the students in this school were African American; the remaining students were European American, Hispanic, Asian, or other ethnicities. The majority of teachers were African American (95%), and the remaining were European American, Hispanic, Asian, Native American, or other ethnicities.

At the time of this study, I was an assistant principal at a different school and school system and was not associated with the school district or school where this research was conducted. I requested and gained permission to carry out this research from the study site school principal.

Currently, teachers differentiate instruction using the learning-focused model, interdisciplinary teaching, and one-on-one practice, along with other strategies; however,

differentiated instruction is typically based on data (Thompson, Gregg, & Niska, 2004). Within the study site school, only 14.4% of students met or exceeded the benchmark score in Algebra I, and only 31.2% of students met or exceeded the standards in math, according to the school's 2014 School Improvement Plan. The concern for many of the teachers as well as administration was to identify the relationship between the way they teach and the way students learn.

Administration and school educators at the study site employ Georgia state standards for curriculum development. Content is delivered to the students through monthly assessments in core subject areas where each student must demonstrate competency. Although the same content is taught across the state using differentiated instruction, Georgia public schools continue to demonstrate low performance on state-wide assessments. Beginning in the fall of 2013, Georgia's College and Career Ready Performance Index replaced the previous assessment of adequate yearly progress, and statewide scores declined approximately 10 points to rate as a failing school system. A score of less than 60 on the performance index is considered failing. In 2011-2012, noncharter schools showed a College and Career Ready Performance Score of 72.8, increasing to 74.4 in 2012-2013, and dropping to 73.8 in 2013-2014 (Georgia Department of Education, 2015b).

The Georgia Department of Education (2015b) reported that Georgia's charter students consistently outperformed those in noncharter schools on the College and Career Ready Performance Index during the 3 school years of 2011-2012 through 2013-2014.

Georgia was the first state to include school climate as an indicator on the assessment, and 2014 data also showed all charters outperforming noncharters on school climate (Georgia Department of Education, 2015b). Despite these numbers, the reports did not reveal the difference in instruction that generated the higher performance.

Research Design and Rationale

In this study, I employed a correlational design (Creswell, 2013) to assess if levels of differentiated instruction provided in the classroom were related to student scores on the 11th-grade EOCTs in literature, biology, geometry, and history. Creative Research Systems (2016) explaiend, "Correlation is a statistical technique that can show whether and how strongly pairs of variables are related" (para. 1). To analyze the data in this correlational study, I used a simple correlation analysis. The first variable was teacher score on the TAPS differentiated instruction rubric for each classroom (see Georgia Department of Education, 2014; see Appendix A). The second variable was 11th-grade student scores on the subject-specific EOCTs. In the study site school district, classroom observations by administrators are conducted three times each semester. I averaged the archival TAPS differentiated instruction scores for each teacher, received from administration, and archival student EOCT scores by classroom came from the school administration as well.

I also used a survey design to provide an opportunity for participating teachers to share their views and insights regarding differentiated instruction and barriers to implementing differentiated instruction in their high school classrooms in this study (see

Appendix B). Likert-type data were gathered with six survey questions. These quantitative survey data were triangulated with the quantitative TAPS data by comparing negative or positive perceptions with TAPS scores. Additionally, I asked three, open-ended survey questions to gather qualitative, supplemental data. The survey data were used to help me draw conclusions from the findings regarding the relationship between differentiated instruction and students' test scores and how teachers view differentiated instruction, which allowed me to develop insightful recommendations for the educators regarding the implementation of differentiated instruction.

Methodology

I used the quantitative research methodology in this study. Researchers in quantitative studies use statistical analyses to determine relationships, meanings, and suggested characteristics (Gay & Airasian, 2001). A quantitative approach uses numeric data to reach objective conclusions (Creswell, 2013), employing convergent reasoning (University of Southern California, 2015). A quantitative research methodology was necessary for me to examine whether there was a relationship between levels of differentiated instruction and 11th-grade student scores on the standardized EOCTs in this study. The data collection involved using scores on the TAPS data tool and 11th-grade student scores on the standardized ECOT assessments. Therefore, a quantitative approach was appropriate for proper analysis of the data because I utilized numeric data in the study to test for the significance of the relationship between teacher TAPS scores and student scores as well as numeric survey data.

Sample Selection

I obtained the participants in this study using purposive sampling. Purposive sampling involves selecting a sample based on the participants' particular knowledge or expertise in an area (Berg & Lune, 2011). The sample for this study was full-time teachers of core 11th-grade subjects at the target high school. Teachers of core subjects were included due to having a direct effect on subject-specific EOCT scores of students as well as being trained to use differentiated instruction. In this context, core subjects included science, math, social studies, English and literature, and writing, as these subjects are associated with Georgia statewide standardized tests. Participating teachers at the target high school had to have at least 1 year of experience, have more than 20 hours of professional development on differentiated instruction based on the Georgia TAPS, and be familiar with subject-specific standardized assessments. Potential participants were excluded if they were aides, part-time staff, or teachers of noncore (elective) subjects or if they had less than 1 year of experience at the target high school or had not completed professional development and training in differentiated instruction. Based on the number of potential participants who met the inclusion criteria, the possible sample size for this study was 18 teacher participants at the high school.

I averaged student scores by classroom. Depending on teacher participation, scores of roughly 90–135 students could be gathered. The 18 potential participant teachers taught in different subject areas, and thus, some students had scores gathered in different subject areas. In other words, many of the students were in more than one class

taught by the teachers in the study. For instance, one student could be in literature, biology, geometry, and history classes, corresponding to four different teachers in the study. Based on a class size of 20 students and 18 teachers, 18 x 20 = 360, then divided by 4 (representing the four subject areas) = 90 students. Based on a class size of 30 students with 18 teachers, 18 x 30/4 = 135 students. Therefore, the potential number of students whose scores needed to be gathered was roughly 90–135. Based on a power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009), the required sample size for the procedure of a bivariate normal model (two-tailed) correlation with the input parameters of alpha = .05, power = .80, and medium effect size of .30, was determined to be $N = 111$.

As I describe in Chapter 4, I determined 22 teachers at the study site met the criteria. Of the 22 educators who satisfied all inclusion criteria, 17 responded to my invitation e-mail. The informed consent form was sent to the 17 respondents who expressed interest in participating in the study. Only 15 educators signed and returned their forms within the specified response time frame. Therefore, the final sample size for this study was 15 teachers and roughly 75–113 students. Of these 15 participant teachers, only six completed surveys, so the sample for Research Questions 2 and 3 was six.

Procedures for Recruitment, Participation, and Data Collection

I recruited teachers as participants for this study. Administrators of the school provided me with a list of e-mail addresses for the 11th-grade teachers. I sent each teacher an invitation letter via e-mail expressing the voluntary nature of participation,

confidentiality, and the basic details of the study. If a teacher wanted to participate in the study, he or she could respond to me directly via e-mail. Interested teachers then received informed consent forms and were made further aware of the voluntary nature of participation. Teachers were also informed that their names, corresponding TAPS rubric scores, and corresponding classroom average EOCT scores would be coded and individual results would be known only by me. Teachers and classroom scores corresponded by alpha labeling (e.g., Teacher A, Classroom A). Further, I presented the results in the final report in aggregate to prevent the identification of any teacher participants. Each participant had the right to withdraw from any portion of the study at any point. It was important for me to stress to participants that these data would be used to assess whether there was a correlation between levels of differentiated instruction and student scores on the subject-specific EOCT. The study was not an evaluation of the teacher as a professional; it was a measure of student test scores as a result of differentiated instruction. Data were used only for analysis in this study and would not reflect or impact teachers' careers. All participating teachers provided written informed consent prior to participation in this study. The informed consent detailed participants' rights to privacy and confidentiality, as well as the right to withdraw from the study at any time with no penalty.

Data Collection

For the purpose of this study, I collected quantitative data from three sources. Sources were archival teacher scores on TAPS rubrics, archival data showing student

EOCT passing rates, and Likert-scale survey data. I collected qualitative data for triangulation.

TAPS differentiated-instruction rubric. The TAPS rubric on differentiated instruction (Georgia Department of Education, 2014) is used by administrators at the school three times each semester. Teachers are scored based on two 15-minute observations and one 30-minute classroom observation on the TAPS rubric. TAPS data were collected by a school administrator (assistant principal) and submitted to me. I am also experienced in TAPS evaluation. The scores were based on a standardized TAPS scoring rubric (see Appendix A). I averaged each teacher's scores to obtain a mean level of differentiated instruction.

Each item on the TAPS rubric receives a score of 0 for Level I, representing no use of knowledge of the practice; 1 for Level II, indicating inconsistent practice; 2 for Level III, indicating consistent demonstration of the practice and needs of students; and 3 for Level IV, indicating continual use of content and pedagogical knowledge (Georgia Department of Education, 2014). For the differentiated instruction TAPS rubric, the 17 items represent a possible score range of 0–51. I received EOCT data and TAPS observation data by classroom from the administration. TAPS scores were collated with the average classroom score of 11th-grade students on the EOCTs, whether in literature, biology, geometry, and history. For statistical analysis, alpha codes identified each classroom to protect the privacy and confidentiality of participants.

Survey. Each of the 18 participating teachers received a link to the survey via e-mail. I acquired the e-mail addresses from the designated administrator and entered them into the online invitation tool in SurveyMonkey. Surveys took less than 20 minutes to complete. I downloaded survey data from the SurveyMonkey website using a personal password. I used survey data to answer Research Questions 2 and 3 regarding teacher perceptions of differentiated instruction and barriers to fully implementing it, respectively. Specifically, to answer Research Question 2, I used a Pearson correlation to examine whether a relationship existed between the TAPS rubric score and the survey Likert data indicating agreement with the value of differentiated instruction (Survey Items 7–12). I used qualitative responses to open-ended questions to supplement Research Question 3 (Survey Items 13–15).

EOCT scores. Georgia high school students take statewide standardized tests (EOCTs) in core subjects (literature, biology, geometry, and history) twice per year. Each Georgia high school student has statewide assessment scores for all core subjects available to administration and district offices for review and analysis. The designated administrator aligned these data per target class, expressed as the mean score per classroom (as well as median and range of scores) on the subject-area EOCT. I paired scores with each teacher's TAPS observation scores. All student data were de-identified so that student, gender, and race were not included, protecting the rights of students. I coded teacher information to protect the identities of teacher participants. Again, I presented results in aggregate rather than by individual teacher and classroom.

Instrumentation and Operationalization of Constructs

To obtain valid results from a study, it is important to utilize valid measuring instruments. This study included the Georgia TAPS rubric; state standardized assessment EOCT scores; and a survey of participants, which was conducted using SurveyMonkey, an online, confidential survey tool. In this section, I explain how each instrument was used and what each measured within the study.

Level of differentiated instruction was assessed using the Georgia TAPS rubric. The TAPS is an indicator of quality teaching practices, and the standards are in accordance with the standards of the Pearson Evaluation Systems group, the Georgia Department of Education, and the Georgia Standards Commission (Georgia Department of Education, 2014). The standards and outlined practices are designed to foster accountability and improvement of classroom instruction. According to the Georgia Department of Education (2014), "The performance indicators are examples of the types of performance that may occur if a standard is being successfully met" (p. 11). The TAPS include 10 standards (professional knowledge, instructional planning, instructional strategies, differentiated instruction, assessment strategies, assessment uses, positive learning environment, academically challenging environment, professionalism, and communication); however, in this study I focused only on the TAPS differentiated instruction standard.

The TAPS differentiated instruction rubric measures the content, process, product, and learning environment provided by each teacher. Each of these indicators is measured

on a 4-level scale (see Appendix A). Individual items are scored from 0–3 and tallied, so the total raw score range for the 17-item rubric is 0–51. Each item on the TAPS rubric receives a score of 0 for Level I, representing no use of knowledge of the practice; 1 for Level II, indicating inconsistent practice; 2 for Level III, indicating consistent demonstration of the practice and needs of students; and 3 for Level IV, indicating continual use of content and pedagogical knowledge (Georgia Department of Education, 2014). For the differentiated instruction TAPS rubric, the 17 items represent a possible score range of 0–51. After calculating the mean TAPS score for each educator, the scores were divided as such: Level I, for mean scores of 0; Level II, for mean scores of 1–17; Level III, for mean scores of 18–34; and Level IV, for mean scores of 35–51.

At the study site, teachers are scored based on two 15-minute classroom observations and one 30-minute observation throughout the semester, using the TAPS scoring rubric. I am experienced in conducting and interpreting TAPS evaluations. I received the TAPS evaluation data as well as EOCT data by classroom. I averaged each teacher's scores to obtain a mean TAPS rubric score for the teacher.

I determined student performance using classroom average score on the Georgia statewide assessment, the EOCTs, for the time period following data acquisition for the TAPS. Georgia statewide assessments are conducted twice per year, so I used the assessments conducted during the fall semester. Georgia statewide assessments for 11th grade include the EOCTs in literature, biology, geometry, and history. Georgia statewide assessments are official data used to demonstrate compliance with federal NCLB

mandates and are therefore assumed to be reliable and valid measures of student achievement. For the present study, the dependent variable was the average classroom student score on the Georgia EOCT for the topic area that corresponded to each participating teacher's classroom. I acquired the score data from the assistant principal at the target high school.

I created a survey for this study so participating teachers could provide their perspectives regarding differentiated instruction (see Appendix B). The survey was focused on the impact of differentiated instruction in the classroom and the barriers to fully implementing differentiated instruction. Three demographic questions (gender, years of teaching, and years of implementing differentiated instruction) began the survey. Participants then answered a series of questions regarding the impact of differentiated instruction in their classroom using a 1–5 Likert-type response scale (from *strongly disagree* to *strongly agree*), with an area to explain each rating. Topics included differentiation effects on student learning, differentiation effects on instruction, and differentiation of student behavior. With the survey, participants had the opportunity to express their views regarding areas of differentiated instruction that can be improved, barriers to fully implementing differentiated instruction, and any additional comments they chose to make regarding differentiated instruction. The complete survey is provided in Appendix B. I acquired survey data using SurveyMonkey, an online survey tool.

In order to ensure validity and reliability of this portion of the study, I conducted a pilot study. A pilot study is designed to sharpen the research procedures and test the

reliability and validity of the instrument. I used a purposive sample for identifying participants of the pilot study. Using a small number of participants ($N = 9$), I administered surveys to each participant and analyzed results. The participants did not indicate any problems with the survey, so it was used as originally designed.

Data Analysis Plan

The TAPS scores derived from the observations conducted by school administrators indicated which level of differentiation was being implemented. TAPS and statewide testing data were aligned in an Excel spreadsheet. Descriptive statistics included means, ranges, and standard deviations, as appropriate, for TAPS rubric score and average student score on the EOCT. Simple correlation statistics were used to answer Research Question 1: Is there a statistically significant relationship between teacher score on the TAPS differentiated instruction rubric and the average 11th-grade student score on the EOCT in the teacher's classroom? A statistically significant positive relationship was hypothesized between teacher TAPS rubric score and the classroom average 11th-grade student score on the EOCT. For these Pearson correlation analyses, the classroom average score on the EOCT was one variable, and TAPS rubric score was the other. Statistical significance was assessed at the $p < .05$ threshold. If the p-value was less than .05, the null hypothesis could be rejected. The null hypothesis was that there would be no statistically significant relationship between teacher TAPS rubric score and the classroom average 11th-grade student score on the EOCT.

I analyzed quantitative Likert-scale data from the survey with TAPS scores to answer Research Question 2: What is the relationship between teacher perception of differentiated instruction and teacher TAPS rubric score? This research question asked whether teacher attitudes were reflected in their practice. I compared Likert-scale survey results of negative perceptions or positive perceptions of differentiated instruction to TAPS scores using Pearson correlation. These results further clarified whether perception had any effect on level of implementation. The null hypothesis was that there would be no statistically significant relationship between teacher TAPS rubric score and teacher combined score on the Likert-scale survey items (indicating agreement with the value of differentiated instruction).

Descriptive statistics were triangulated with qualitative survey results also to answer Research Question 3: What are the barriers to fully implementing differentiated instruction? Schwandt (2007) stated, “Triangulation is a means of checking the integrity of the inferences one draws” (p. 298). By triangulating results from different sources, the results of this study could bring a greater understanding of differentiated instruction from the perspective of the teachers. I analyzed teacher answers to open-ended questions to determine common themes.

SurveyMonkey is an online survey tool. SurveyMonkey data are private, SSL encrypted, and password protected. The SurveyMonkey (2016) privacy policy emphasized the survey, respondent data, and respondent e-mail addresses are treated as private information and are not sold by SurveyMonkey. Participants accessed the survey

by clicking on a link provided through e-mail. Using a personal password, I downloaded survey data in Excel format for analysis.

Threats to Validity

Reliability and validity are important to determine the consistency of results and account for the trustworthiness of tools (Claudy, 1978). A reliable measurement or test produces consistent results internally, between raters, or over repeated testing (University of Southern California, 2015). The TAPS rubric and the standardized assessments are used throughout Georgia and are assumed to be valid and reliable (Georgia Department of Education, 2014). Cronbach's alpha was used to assess the reliability of quantitative survey data, because "Cronbach's alpha is the most common measure of internal consistency ('reliability')" (Lund Research, 2013, para. 1). Cronbach's alpha scores of .70 or higher are considered acceptable for survey research (Nunnally, 1978).

Threats to internal validity included the use of a subjective scoring rubric and the use of a small, purposeful (nonrandomized) sample. Another potential threat was mortality of the sample. Those teachers who chose to participate and continue with the study might be more interested in differentiated instruction and more prone to its practice.

Another threat was researcher bias in interpreting the qualitative survey data. I acknowledged any personal biases about the topic prior to undertaking the study. This self-knowledge help prevented researcher bias from entering into analysis of the qualitative data in particular.

Ethical Procedures

I took steps for the protection of participant rights, including informed consent, voluntary participation, fostering confidentiality, and protection from harm. The Walden University Institutional Review Board approved the study (Approval Number 01-10-18-0258712). Each participant signed the informed consent form prior to the onset of the study. Further, the informed consent stated that study participants had the right to exclude themselves from the study at any time without personal consequence. I assigned teachers codes to protect the identities of all parties involved. To further ensure the privacy of participants, I did not disclose the name or specific location of the institution. Finally, I did not present individual teacher and classroom data in the final report; rather, I presented results in aggregate.

SurveyMonkey data are encrypted and password protected. All study data will be kept private and confidential in a locked document bag (paper copies) and an encrypted folder (electronic copies). Norton and Trust systematic privacy and protection software will be used to guard against virus, leaks, or compromise of vital information on an electronic device, site, or tool. Data analysis was conducted on my password-protected computer. In these ways, the rights of participants were and will continue to be protected.

Summary

The purpose of this quantitative research was to evaluate the relationship between level of differentiated instruction and EOCT scores of 11th-grade students by classroom. Chapter 3 detailed the methodology of the research. This chapter included the following:

aim of study, research approach, participants, data collection tools, access and permission, procedures, data analysis, and ethical considerations. The results of the analysis of the quantitative data are reported in Chapter 4.

Chapter 4: Results

The purpose of this quantitative correlation study was to ascertain if there was a relationship between level of differentiated classroom instruction and 11th-grade student scores on the EOCTs in literature, biology, geometry, and history in a Georgia high school. In this study, I used a simple correlation analysis to test for the existence of a relationship between the independent variable of teacher scores on the TAPS differentiated instruction rubric and the dependent variable of 11th-grade student scores on the subject-specific EOCTs. The following research questions and hypotheses established the conditions for which the relationship between the independent and dependent variables were examined:

Research Question 1: What is the relationship between teacher score on the TAPS differentiated instruction rubric and 11th-grade student scores on the EOCT in the teacher's classroom?

$H1_0$: There is no statistically significant relationship between teacher TAPS rubric score and 11th-grade students' score on the EOCT.

$H1_A$: There is a statistically significant positive relationship between teacher TAPS rubric score and 11th-grade students' score on the EOCT.

Research Question 2: What is the relationship between teacher perception of differentiated instruction and teacher TAPS rubric score?

$H2_0$: There is no statistically significant relationship between teacher perception of differentiated instruction and teacher TAPS rubric score.

$H2_A$: There is a statistically significant positive relationship between teacher perception of differentiated instruction and teacher TAPS rubric score.

Research Question 3: What are the barriers to fully implementing differentiated instruction?

This chapter includes a presentation of the data collection process and results of the data analysis in this study. In this chapter, I also describe the analysis to test the main hypothesis. The chapter concludes with a summary of answers to the three research questions of the study.

Data Collection

I collected 3 months of archival data from the Georgia TAPS differentiated instruction rubric (Georgia Department of Education, 2014; see Appendix A) for 15 educators teaching 11th grade at the study site. The data were for Fall 2017. In addition, I gathered students' Fall 2017 EOCT scores for each educator's classroom to answer Research Question 1. I collected self-reported survey data for triangulation and to answer Research Questions 2 and 3 regarding teacher perceptions of differentiated instruction and the barriers to fully implementing it, respectively. Specifically, to answer Research Question 2, a Pearson correlation was to be utilized to examine whether a relationship existed between the TAPS rubric score and the survey Likert data indicating agreement with the value of differentiated instruction (Survey Items 7–12). However, the sample size was too small for that type of quantitative analysis. Finally, I used qualitative

responses to the open-ended survey questions to answer Research Question 3 (Survey Items 13–15).

In the data collection plan in Chapter 3, I stated that the study would include 18 educators. The number of qualifying educators at the study site was 22, and I sent the invitation e-mail to all of those qualifying individuals. Of the 22 educators who satisfied all inclusion criteria, 17 responded to my invitation e-mail. I sent the informed consent form to the 17 respondents who expressed interest in participating in the study, and 15 educators signed and returned their forms within the specified response time frame. Therefore, the sample size for this study—specifically, Research Question 1—was 15 teachers and roughly 75–113 students (323 test scores were gathered but not identified by student).

Data collection for the online survey occurred over a 14-day period. Over the course of the 14 days, I sent the group five e-mail reminders to complete the survey, sending e-mails every 3 days. Once the 14-day period ended, access to the online survey was restricted. Six educators out of the 15 who participated in the study completed the online survey. Therefore, the sample size for Research Questions 2 and 3 was $N = 6$. Based on a population of 15 participants, the response rate for the survey was 40%.

Demographic Characteristics of the Sample

Table 1 depicts the demographic details for the educators whose TAPS scores were used for the study. Table 2 presents the detailed demographics of the sample subset of six teachers who completed the survey. The majority of respondents were female and

had 3–5 years of teaching experience. Only one participant (16.7%) had been teaching 10 or more years. Just 2 of the 6 respondents reported a teaching specialty; one reported "biological sciences," and the second did not specify the specialty.

Table 1

Characteristics of Total Sample

Characteristic	*n*
Gender	
Female	11
Male	4
Subject taught	
History	3
Geometry	3
Biology	4
Literature	5
Average TAPS differentiated instruction score	
35–41	5
42–51	10

Note. $N = 15$. TAPS = Teacher Assessment Performance Standards. TAPS scores range from 0–51. Scores 35–51 indicate Level IV, continual use of content and pedagogical knowledge.

Table 2

Demographic Characteristics of Survey Respondents

Characteristic	*n*
Gender	
Female	5
Male	1
Years in teaching role	
1–2	2
3–5	3
10+	1
Teaching specialty	
No	4
Yes	2

Note. $N = 6$.

Representativeness of Sample

According to LeBlanc (2004), much of the use of research lies in its representativeness, that is, how similar it is to "the larger population" (p. 2). As described by Berg and Lune (2011), the representativeness of research is determined in large part by the data collection methods employed. Moreover, any knowledge gleaned from observations or measurements of a sample can generally be used to estimate differing characteristics of the population of interest (LeBlanc, 2004). Therefore, adequate representative sampling serves as a prerequisite for proper generalization. In this study, I used purposive sampling, a method that involves selecting a sample based on the participants' particular knowledge or expertise in an area (Berg & Lune, 2011).

For this study, the population of interest was full-time 11th-grade core curriculum teachers in a Georgia high school who had a minimum of 1 year of teaching experience,

had completed at least 20 professional development hours based on Georgia TAPS, and were experienced with and knowledgeable of subject-specific standardized assessments. I designed the inclusion criteria for participation in this study to increase the likelihood that the representational sample included educators who were familiar with and currently utilizing various methods of differentiated instruction. The number of educators at the study site who met the criteria was 22, making up the population size. The sample size for this study was 15 educators. Because of the small study sample, results of this study are generalizable only to the population of educators at the study site, and not to other populations, other grade levels, or other geographical areas.

The sample of 15 educators adequately represented the population of interest for several reasons. First, the sample accounted for 68% of the larger population. Another reason was that the sample included educators with a variety of teaching experience, both overall and with applying differentiated instruction methods. Furthermore, teachers in the sample accounted for all four core subject areas that participate in mandatory end-of-course testing. Finally, the standard deviation of the sample's average TAPS scores indicated that scores were not closely concentrated around the mean of the group. This equates to variety in the levels of differentiated instruction being used by teachers within the sample. Though small, data gleaned from the sample of this study provided reasonable insight into the relationship, or lack thereof, between levels of differentiated instruction and 11th-grade student scores on the EOCT in a Georgia high school.

Results

Research Question 1

I used a simple Pearson correlation analysis to address Research Question 1: What is the relationship between teacher score on the TAPS differentiated instruction rubric and the average 11th-grade student score on the EOCT in the teacher's classroom? The mean for teachers' TAPS scores was determined by averaging the TAPS differentiated instruction scores for each teacher, received from scores assessed by administrators during classroom observations. Classroom observations are conducted by school administrators three times each semester. The TAPS scores I used for this study were collected during the Fall 2017 semester.

For the differentiated instruction TAPS rubric, the 17 items represent a possible score range of 0–51. All participants scored over 35, with five scoring 35–41 and 10 scoring 42–50. Scores of 35–51 represent Level IV, the highest level, indicating continual use of content and pedagogical knowledge (Georgia Department of Education, 2014).

The mean TAPS rubric score for all teachers was 43.47, with a range of 15 points (35–50). The standard deviation, a measure of central tendency, of the average TAPS rubric scores of the sample was 4.75. EOCT score was the dependent variable. The mean classroom EOCT average was 83, with a range of 7 points (80–86). The scatterplot in Figure 1 illustrates the relationship between the independent variable of level of differentiated instruction and the dependent variable of classroom mean EOCT score.

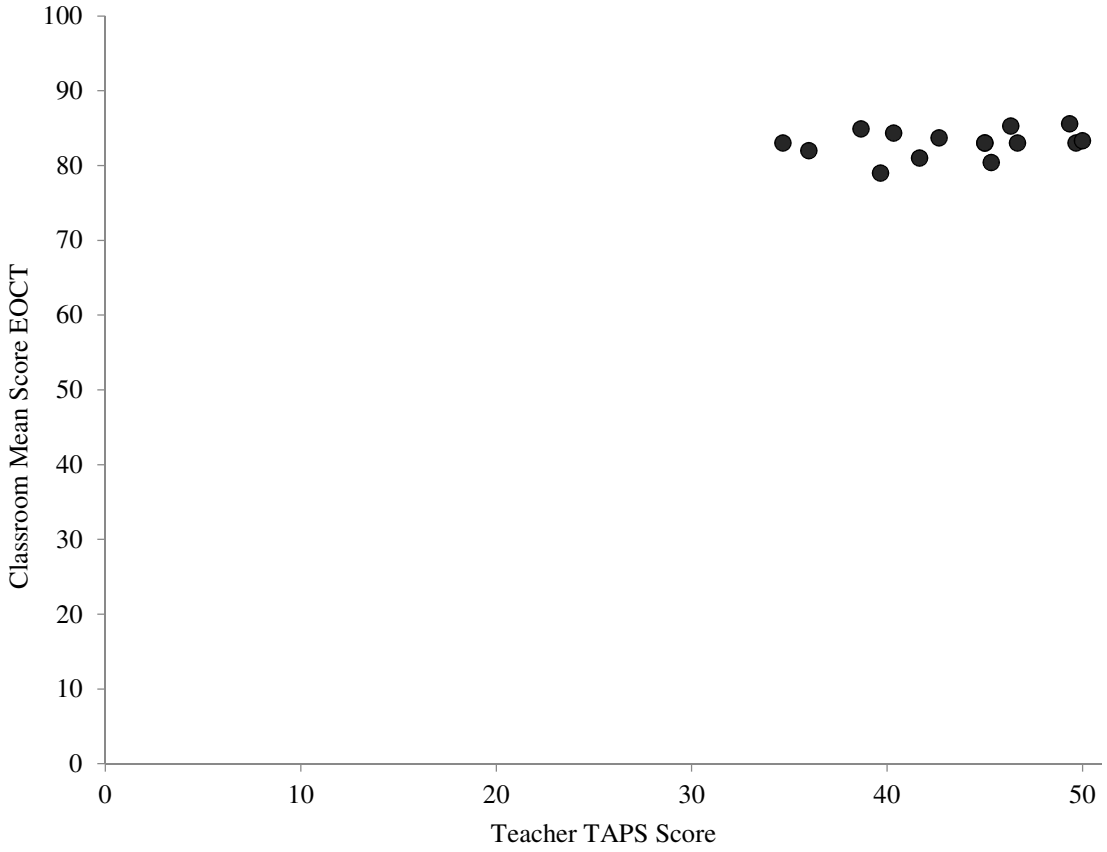

Figure 1. Scatterplot of relationship between average Teacher Assessment Performance Standards (TAPS) differentiated instruction score and average classroom score on the End-of-Course Test (EOCT).

To determine whether the two variables were significantly correlated, I conducted a Pearson correlation analysis. The results of the analysis indicated a correlation coefficient of $r(15) = .229$ between teachers' average TAPS scores and average classroom EOCT scores, $p = .412$. The value of a correlation coefficient is denoted as r and will range from -1 to +1 (Thomas, 2012). The low absolute value of r indicated a weak relationship, and the p-value > .05 indicated no statistical significance. I could not

reject the null hypothesis because no statistically significant relationship was found between teacher TAPS rubric score and 11th-grade students' score on the EOCT.

Research Question 2

Research Question 2 was the following: What is the relationship between teacher perception of differentiated instruction and teacher TAPS rubric score? To answer Research Question 2, a Pearson correlation was to be utilized to examine if a relationship existed between the TAPS rubric score and the survey Likert data indicating agreement with the value of differentiated instruction (Survey Items 7–12). However, data were only available for six respondents, which was too small a sample size for me to use a Pearson correlation.

With the second research question, I sought to explore whether teacher perception of differentiated instruction related to teaching practices. I examined the relationship between the average TAPS rubric scores and the survey Likert data indicating agreement with the value of differentiated instruction (Survey Items 7–12). To indicate such agreement, survey respondents would have indicated that they *Agree* (4) or *Strongly Agree* (5) on the Likert scale for survey Items 7 through 12. Table 3 presents the breakdown of responses to Survey Items 7–12.

Table 3

Frequency of Participant Responses to Survey Items 7–12

Survey item	Strongly agree	Agree	Neutral
7. Differentiated instruction improves teaching.	6	0	0
8. Differentiated instruction improves student engagement in learning.	4	2	0
9. Differentiated instruction improves student achievement.	3	2	1
10. Differentiated instruction improves management of the classroom environment.	4	2	0
11. I have been successful in implementing differentiated instruction techniques in my classroom.	2	3	1
12. Differentiated instruction should be implemented in all classrooms.	5	1	0

Note. $N = 6$. No respondents chose *disagree* or *strongly disagree* options.

Next, the mean score by teacher of responses to Survey Items 7–12 indicating attitudes toward differentiated instruction was compared to each teacher's mean TAPS score. I conducted a Pearson correlation to examine the relationship between TAPS rubric score and the survey Likert data. The results of the Pearson correlation reflected a correlation strength of $r = .462$, $p = .356$, indicating a moderately positive relationship between TAPS rubric scores and survey Likert data. However, the relationship was not statistically significant. According to Frankfort-Nachmias and Leon-Guerrero (2011), Pearson correlations of .40 to .59 indicate a moderate strength of linear association between two variables. The survey respondents indicated agreement with the value of differentiated instruction. The high level of agreement with the value of differentiated instruction supports the mean TAPS score of 43.06 for teachers who participated in the

study. As noted earlier, the 17 items represent a possible score range of 0–51. The aggregate average of 43.06 indicated that educators consistently have supported classroom instruction with differentiated methods. This level of application aligns with the high agreement of the value of differentiated instruction expressed by survey respondents.

However, the small sample size made interpretation of the Pearson correlation statistically questionable. Thus, I used a scatterplot to provide a clear picture of the nature of the relationship. Figure 2 presents a scatterplot showing the distribution of mean survey response and TAPS score, by teacher. Figure 2 suggests higher survey responses related to higher TAPS score. However, review of the data showed the teacher with the highest survey response had the second lowest TAPS score. The teacher with the lowest survey score had the lowest TAPS score.

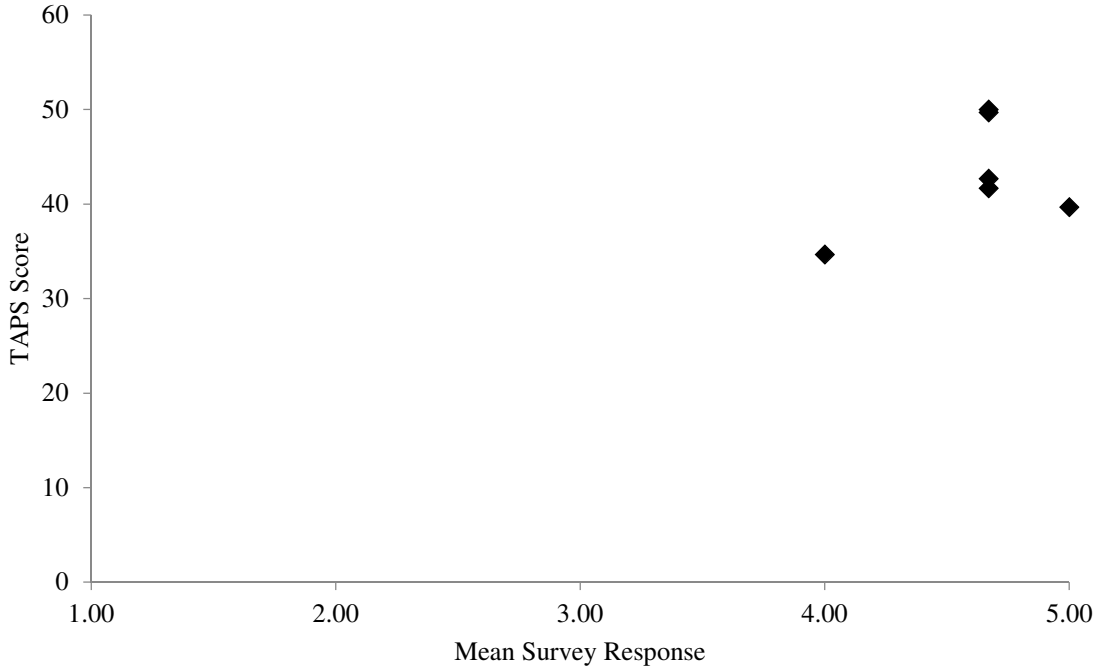

Figure 2. Scatterplot of relationship between average teacher response on 5-point Likert-scale survey responses and average Teacher Assessment Performance Standards (TAPS) differentiated instruction score. $N = 6$. Higher survey response (scale of 1–5) indicates better attitudes toward differentiated instruction. Higher TAPS score (0–51) indicates higher levels of differentiated instruction demonstrated in the classroom.

Research Question 3

Research Question 3 was the following: What are the barriers to fully implementing differentiated instruction? Qualitative responses to open-ended questions were used to answer Research Question 3 (Survey Items 13–15). I asked the third research question to explore the barriers teachers face when attempting to fully implement differentiated instruction. Teachers identified the barriers through the qualitative responses to open-ended survey items. Thematic analysis of responses to the survey's open-ended questions noted several similarities in responses.

Survey Item 13 asked, “How can the concept of differentiated instruction be improved?” I drew two primary themes from survey responses. The first theme was the need for more formative assessments to test in-process learning. The second theme called for the increased use of inquiry activities that promote creativity and collaboration.

Survey Item 14 asked, “What are the greatest barriers to your full implementation of differentiated instruction in your classroom?” For this question, 5 out of 6 survey respondents indicated that lack of access to or availability of resources served as the most pressing barrier to full implementation of differentiated instruction. The sixth response addressed limitations in presenting information with varying degrees of creativity and complexity.

Finally, Survey Item 15 asked, “What other comments would you like to provide regarding differentiated instruction?” Two primary themes were drawn from survey responses. The first theme, expressed by two survey respondents, was that differentiated instruction should address all learning needs. One respondent stated, “It’s about the students and their needs. So it should always be applied.” Another said differentiated instruction “is necessary in all classrooms, no matter how much learning styles vary.” The second theme, drawn from five of the survey responses, was the need for school administrators to provide teachers with access to more support (training) and resources that allow for differentiated instruction to be fully implemented in the classroom.

Summary

In this study, I sought to test the effectiveness of differentiated instruction in a Georgia high school. For Research Question 1, I found no statistically significant relationship between teacher TAPS rubric score and 11th-grade students' score on the EOCT. For Research Question 2, the results indicated teachers had both high TAPS scores and high agreement with survey items regarding the value of differentiated instruction.

For Research Question 3, I drew themes from the teacher responses to open-ended survey questions. The themes illustrated that teachers understand the importance and necessity of differentiated instruction but need more support and access to resources to fully implement differentiated instruction in their classrooms. Results from this study may provide a foundation for further research.

The primary purpose of this quantitative research was to evaluate the relationship between level of differentiated instruction and EOCT scores of 11th-grade students by classroom. In Chapter 4, I offered an analysis of the data collected for this study. In Chapter 5, I provide an interpretation of the findings in greater detail and recommendations for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quantitative correlation study was to ascertain if there was a relationship between level of differentiated classroom instruction and 11th-grade student scores on the EOCTs in literature, biology, geometry, and history in a Georgia high school. I conducted this study to test the effectiveness of differentiated instruction in a Georgia high school. The literature review was concentrated on differentiated instruction and its application and effectiveness as tool for achieving meaningful learning (see Konstantinou-Katzi et al., 2013). Currently, no published studies had investigated whether higher levels of differentiated instruction in Georgia high school classrooms were associated with higher student performance on the 11th-grade EOCTs in literature, biology, geometry, and history. With this study, I sought to fill the gap in the published literature.

The findings from this study revealed no statistically significant relationship between teacher TAPS rubric score and 11th-grade students' score on the EOCTs. Further, teachers had both high TAPS scores and high levels of agreement with survey items regarding the value of differentiated instruction, suggesting that believing in the value of differentiated instruction resulted in classroom demonstration of it. Finally, teachers indicated understanding the importance and necessity of differentiated instruction but need more support and access to resources to fully implement differentiated instruction in their classrooms.

Interpretation of the Findings

I developed three research questions to guide this study. With the first, I sought to examine the relationship between TAPS scores and EOCT performance. Simple correlation statistics were used to answer Research Question 1: What is the relationship between teacher score on the TAPS differentiated instruction rubric and 11th-grade student scores on the EOCT in the teacher's classroom? A statistically significant positive relationship was hypothesized between teacher TAPS rubric score and the classroom average 11th-grade student score on the EOCT; however, the results of the analysis indicated no statistically significant relationship between teacher TAPS rubric score and 11th-grade students' score on the EOCT. This finding is consistent with Wormeli's (2012) assertion that differentiated instruction is not a definite key to success; rather, teachers "must engage in various forms of professional development" (p. 38) before they are able to fully meet the learning needs of students. However, this finding appears to be at odds with the work of other researchers I previously discussed in Chapter 2 who reported that students made better progress in classrooms where differentiated instruction methods were systematically employed (Dosch & Zidon, 2014; Valiandes, 2015).

Despite all teachers' TAPS scores being 35 or higher—consistent with Level IV, continual use of content and pedagogical knowledge (Georgia Department of Education, 2014)—the relationship between teacher TAPS rubric score and 11th-grade students' EOCT scores was relatively weak. In the data set used, EOCT scores both showed little variability; all classes were comparable and on a high level. Further, TAPS scores

showed little variability, all being at a high level. Whereas literature on differentiated instruction highlighted various perspectives on the impact (benefits and setbacks) of differentiated instruction, most researchers contended that the sufficient and ongoing application of differentiated instruction would positively orient students toward achievement (Tomlinson, 2000; Wu, 2013). What this suggests in terms of this study was that the higher a teacher's TAPS rubric score, the higher his or her students' performance on the EOCTs, indicated by a high mean EOCT score. For this study, the mean TAPS rubric score for all teachers was 43.47, with a range of 15 points (35–50), but the mean classroom EOCT average was 83, with a range of only 7 points (80–86), which was less than half the range of the difference seen in teachers' TAPS rubric scores. Moreover, the teacher with the highest survey response had the second lowest TAPS score, which ran counter to the consensus that the greater the application of differentiated instruction, the better students perform (Robinson et al., 2014; Tobin & Tippett, 2014; Tomlinson, 2000; Wu, 2013). My findings for Research Question 1 suggest that maybe another factor, such as the level and extent of professional development obtained by the teacher, may impact the performance of 11th-grade students on EOCTs.

Importantly, however, the sample size for the analysis was not adequate to draw generalizable conclusions. G*Power recommended 111 participants; therefore, the findings are limited to this sample. Kim and Seo (2013) noted that studies can be done with smaller than recommended sample sizes; however, results must be interpreted with caution. They noted a faulty tendency by some researchers to assume a significant

difference is important when the sample is too small to derive a valid conclusion. Kim and Seo reiterated Altman and Bland's (1995) reminder to researchers that "absence of evidence is not evidence of absence" (p. 485).

Due to collecting data from just six participants, I could not use Pearson correlation to answer Research Question 2: What is the relationship between teacher perception of differentiated instruction and teacher TAPS rubric score? Only 6 teachers out of the 15 who participated completed the survey, for a 40% response rate, bringing the sample to six for this question and Research Question 3. For Survey Items 7–12, participants indicated their agreement with the value of differentiated instruction. The results are presented in Table 3 of Chapter 4. Teachers showed both high levels of agreement with survey items indicating the value of differentiated instruction and high TAPS scores, indicating demonstration of differentiated instruction in the classroom. Given the relatively high TAPS rubric scores of teachers who participated in the study, I was not surprised to see such a high level of agreement with the value of differentiated instruction. Further, teachers self-selected into the study. With the exclusion of one instance, all teachers expressed agreement with Survey Items 7–12. Consistent with previous studies, the findings from this research question suggested that a strong demonstration of differentiated instruction is generally underpinned by teachers' intentional use and application of the practice as a way to improve student learning, performance, and achievement. Again, the mean TAPS rubric score of the teachers who participated in the survey was consistent with continual use of differentiated content.

One of the main concepts I found in previous research was that differentiated instruction is a prominent element that determines how students learn (Tomlinson, 1999, 2000). This concept proves useful in understanding the importance of teachers regarding the differentiated practice as valuable. Agreement with the value of differentiated instruction contributes to the overall process of demonstrating the practice on a consistent or continual basis. The finding for Research Question 2 serves as a reminder of differentiated instruction as an effective strategy for student performance.

With Research Question 3, I asked the following: What are the barriers to fully implementing differentiated instruction? My analysis of the responses from open-ended Survey Items 13–15 revealed that the improvement of differentiated instruction in teachers' classrooms would be a result of both classroom (internal) and external variables. At the classroom level, teachers reported the need to employ more formative assessments and inquiry activities that test students' in-process learning and promote creativity and collaboration. At the external level, teachers reported that the barriers to full implementation of differentiated instruction were a lack of resources and lack of administrator support. The mean TAPS rubric score of the six teachers who participated in the survey was 43.06, which, again, is consistent with Level IV, indicating continual use of content and pedagogical knowledge (see Georgia Department of Education, 2014). What this finding suggested was that although teachers did not feel they had the proper support to fully implement differentiated instruction, this factor did not impact their ability to implement the practice within their classrooms.

Limitations of the Study

The limitations of my study for the most part remained consistent with the factors I previously outlined in Chapter 1. First, this study was limited by the sample. I originally anticipated recruiting 18 participants but ended up with a sample of 15 for Research Question 1 and an even more modest sample of six for Research Questions 2 and 3, rendering quantitative analysis impossible. With this being the case, it is unlikely that the findings of this study are representative of other high schools in Georgia.

This study was also limited by grade level. I conducted my study on 11th-grade teachers who taught literature, biology, geometry, and history at a Georgia high school. Georgia's standardized measure of student proficiency is administered in 11th grade in the selected subject areas.

Another limitation to this study was the measures of data collection. The survey data were self-reported, which might be susceptible to socially desirable responding, in which subjects respond in a way they think the researcher desires (see Kaminska & Foulsham, 2013; Krosnick, 1999). However, socially desirable responding can be reduced by making surveys anonymous (Dodou & de Winter, 2014) or confidential, as I did in this study. However, the study also was voluntary and thus likely skewed toward participation by teachers interested in the topic. Further, the teachers showed homogenous scoring on the TAPS, and all teachers scored at Level IV on the TAPS rubric. A more differentiated sample might show different findings.

Finally, this study was limited by the design, which was cross-sectional in nature and therefore was not sensitive to changes over time (see Solem, 2015). Overall, the generalizability of the study and, by extension, its duplication were compromised. However, findings from this study can lead to future research on the impact of different levels of differentiated instruction in Georgia classrooms and other similar paradigm-based analyses.

Recommendations

Meeting academic performance objectives remains one of the foremost goals of teachers, regardless of the grade level they teach. Demonstration of differentiated instructional practices is one way that teachers attempt to achieve that objective. However, the findings for Research Question 1 revealed that at this Georgia high school, there was not a statistically significant relationship between the level of differentiated instruction exercised in the classrooms of the 15 teachers who participated in the study and the performance of their students on the EOCTs. This might have been due to the relatively homogenous scoring of the teachers on the TAPS and of students on the EOCTs; all teachers scored within Level IV on the rubric, and students scored over 80% on the EOCTs. With this being the case, it would be relevant for future researchers to investigate the relationship between the two variables in this study, in addition to a third variable, such as professional development. The inclusion criteria for this study required that participating teachers have at least 1 year of professional development. No additional professional development was considered for inclusion or assessed, making it possible

that this variable could have had an impact on teachers' application of differentiated instruction, and thus, the performance of their students on EOCTs. That said, I think a possible area for future research should include investigating the relationship between teacher TAPS rubric score, professional development, and student performance on EOCTs. Moreover, future research could be conducted within a school setting with low-achieving classrooms. The sample in this research was too homogenous to find a relationship between the variables.

The findings for Research Question 2 indicated that all the teachers agreed with the value of differentiated education; however, the limitations of the findings for this question were the small sample in addition to the inclusion of teachers with TAPS rubric scores that were consistent with Level IV, the highest level. Hence, it is important for future researchers to examine the attitudes of teachers across all four levels of TAPS performance with regard to the value of differentiated instruction. Research within a school setting with low achievement might be more useful. Less homogenous scoring among both teachers and students would yield a more robust analysis.

Two major themes that emerged from the findings for Research Question 3 were that teachers reported that (a) lack of access to or availability of resources served as the most pressing barrier to full implementation of differentiated instruction, and (b) school administrators need to provide teachers with access to more support (training) and resources that allow for differentiated instruction to be fully implemented in the classroom. These findings indicate that barriers to the application of differentiated

instruction are in large part due to variables uncontrolled by teachers, such as lack of access to appropriate differentiated resources. The topic of access to differentiated resources is not widely covered in current literature; hence, the issue as a finding of this study suggests that more attention should be given to the role of administrators and school systems in providing teachers with ongoing access to resources and training for differentiated instruction. Future research could address how school leaders are addressing teachers' needs for resources for implementing differentiated instruction. Such topics would help schools to increase or improve teachers' application of the practice.

Implications

Beyond the implications for future research, this study, in which I examined the relationship between differentiated instruction and the academic performance of 11th-grade students attending a Georgia high school, has implications for differentiated instruction and its role in the field of education. One meaningful implication is determining the role of differentiated instruction resources in improving students' performance on EOCT. Increasing teachers' access to differentiated instruction resources may be one way in which the level of differentiated instruction demonstrated could become more consistent with the level at which students perform on their EOCT. Spring (2009) noted that teachers who demonstrate differentiated instruction better reach students and help students apply subject matter to learning assessments. Yet, to demonstrate differentiated instruction, teachers need access to the most appropriate differentiated resources. Furnishing teachers with more resources and training related to

differentiated instruction likely will promote more of an alignment between application and student academic performance, as supported by the literature. The implications for positive social change may include the potential to create stronger support systems (consisting of educators, students, parents, administrators, and the community) for differentiated education. Such systems could help surmount difficulties in the application of differentiated instruction due to critical shortcomings in access to differentiated support.

Conclusion

Overall, the findings of the study indicated that though no relationship was found between teacher TAPS rubric scores and 11th-grade students' performance on EOCT, teachers understand the value of differentiation in the classroom. Teachers reported that the most significant areas of need for implementing differentiated instruction were resources and administrator support. According to Tomlinson (2000), administrator support is a necessary component of a successful implementation of differentiated classroom instruction. Guskey (2014) added that principals and assistants are catalysts for ongoing conversations and applications concerning differentiation instruction. Although the pillars of differentiated instruction are many and complex, variations in pedagogy can be attributed directly to teachers' level of access to resources and administrator support. Although resources may be a difficult challenge, differentiated instruction and administrator support of such practice are worth the undivided attention of school systems across the nation. The findings may highlight new understanding about the role

of differentiated instruction in Georgia classrooms so that critical shortcomings in access to differentiated support can be addressed to encourage teachers to demonstrate differentiated instruction in their classrooms.

References

Altman, D. G., & Bland, J. M. (1995). Statistics notes: Absence of evidence is not evidence of absence. *British Medical Journal, 311,* 485. doi:10.1136/bmj.311.7003.485

Ansell, S. (2011, July 7). Achievement gap. *Education Week.* Retrieved from http://www.edweek.org/ew/issues/achievement-gap/index.html

Baumgartner, T., Lipowski, M. B., & Rush, C. (2003). *Increasing reading achievement of primary and middle school students through differentiated instruction* (Master's thesis). Retrieved from ERIC database. (ED479203)

Berg, B. L., & Lune, H. (2011). *Qualitative research methods for the social sciences* (Vol. 8). Boston, MA: Pearson.

Birnie, B. F. (2015). Making the case for differentiation. *The Clearing House*, *88*(2), 62-65. doi:10.1080/00098655.2014.998601

Carnoy, M., Jacobsen, R., Mishel, L., & Rothstein, R. (2005). *The charter school dust-up.* Washington, DC: Economic Policy Institute.

Cerre, N., Alsace, T., & Gilmartin, J. (2013). Promised land? English learners seeking refuge at Lafayette High School. *Journal of Adolescent & Adult Literacy, 56*, 358-360. doi:10.1002/JAAL.154

Chien, G. C.-W. (2012). Analysis of differentiated instruction in ELL teachers' professional development: A case study. *Teacher Education and Practice, 25*(1), 77-86.

Claudy, J. G. (1978). Multiple regression and validity estimation in one sample. *American Institute for Research, 2*, 595-607. doi:10.1177/014662167800200414

Connor, C. M., Morrison, F. J., Fishman, B., Crowe, E. C., Al Otaiba, S., & Schatschneider, C. (2013). A longitudinal cluster-randomized controlled study on the accumulating effects of individualized literacy instruction on students' reading from first through third grade. *Psychological Science, 24*, 1408-1419. doi:10.1177/0956797612472204

Creative Research Systems. (2016). *Correlation.* Retrieved from https://www.surveysystem.com/correlation.htm

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed method approaches* (4th ed.). Thousand Oaks, CA: Sage.

Dalmia, S. (2007). *No Child Left Behind Act: Keep it or kill it? Law has not lived up to grand expectations.* Los Angeles, CA: Reason Foundation. Retrieved from http://reason.org/news/show/no-child-left-behind-act-keep

Danielson, C. (1996). *Enhancing professional practice: A framework for teaching*. Alexandria, VA: Association for Supervision and Curriculum Development.

Delisle, J. R. (2015, January 6). Differentiation doesn't work. *Education Week, 34*(15), 28. Retrieved from http://www.edweek.org/ew/articles/2015/01/07/differentiation-doesnt-work.html

Denton, C. A. (2012). Response to intervention for reading difficulties in the primary grades: Some answers and lingering questions. *Journal of Learning Disabilities, 45*, 232-243. doi:10.1177/0022219412442155

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

Dobbie, W., Fryer, J., & Roland G. (2013). Getting beneath the veil of effective schools: Evidence from New York City. *American Economic Journal: Applied Economics, 5*(4), 28-60. Retrieved from https://www.aeaweb.org/articles?id=10.1257/app.5.4.28

Dodou, D., & de Winter, J. C. F. (2014). Social desirability is the same in offline, online, and paper surveys: A meta-analysis. *Computers in Human Behavior*, *36*, 487-495. doi:10.1016/j.chb.2014.04.005

Dosch, M., & Zidon, M. (2014). "The course fit us": Differentiated instruction in the college classroom. *International Journal of Teaching and Learning in Higher Education, 26*, 343-357. Retrieved from ERIC database. (EJ1060829)

Doubet, K. J. (2012). Formative assessment jump-starts a middle grades differentiation initiative: A school focuses on formative assessment to support its efforts to differentiate instruction. *Middle School Journal, 43*(3), 32-38. doi:10.1080/00940771.2012.11461809

Ernest, J. M., Heckaman, K. A., Thompson, S. E., Hull, K. M., & Carter, S. W (2011). Increasing the teaching efficacy of a beginning special education teacher using differentiated instruction: A case study. *International Journal of Special Education 26*(1), 191-201. Retrieved from ERIC database. (EJ921209)

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41,* 1149-1160.

Fenwick, L. (2012). Limiting opportunities to learn in upper-secondary schooling: Differentiation and performance assessment in the context of standards-based curriculum reform. *Curriculum Inquiry, 42,* 629-651. doi:10.1111/j.1467-873X .2012.00609.x

Frankenberg, E., & Lee, C. (2003). Charter schools and race: A lost opportunity for integrated education. *Education Policy Analysis Archives, 11*(32). doi:10.14507 /epaa.v11n32.2003

Frankfort-Nachmias, C., & Leon-Guerrero, A. (2011). *Social statistics for a diverse society* (6th ed.). Thousand Oaks, CA: Sage.

Gay, L., & Airasian, P. (2001). *Educational research: Competencies for analysis and application*. Thousand Oaks, CA: Sage.s

George, P. S. (2005). A rationale for differentiating instruction in the regular classroom. *Theory Into Practice*, *44*(3), 185-193. doi:10.1207/s15430421tip4403_2

Georgia Department of Education. (2014). *Teacher Keys Effectiveness System fact sheets.* Retrieved from https://www.gadoe.org/School-Improvement/Teacher-and-Leader-Effectiveness/Documents/FY15%20TKES%20and%20LKES%20Documents/2014-2015%20TKES%20Fact%20Sheets%20-formatted%206-26-14.pdf

Georgia Department of Education. (2015a). *Georgia approved to use "differentiated accountability"* [Press release]. Retrieved from http://www.gadoe.org/External-Affairs-and-Policy/communications/Pages/PressReleaseDetails.aspx?PressView=Archive&pid=207

Georgia Department of Education. (2015b). *Georgia charter schools and charter systems, 2014-2015 and 2015-2016.* Retrieved from https://www.gadoe.org/External-Affairs-and-Policy/Charter-Schools/Documents/2015%20Charter%20Schools%20and%20Charter%20Systems%20Annual%20Report.pdf

Gormley, K., & McDermott, P. (2014). Differentiating literacy instruction—There's an app for that! *Language and Literacy Spectrum, 24*(1), 49-75. Retrieved from ERIC database. (EJ1034918)

Graham, K. J. (2009). *Mandated implementation of differentiated instruction effectiveness examined* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 3366972)

Guilfoyle, C. (2006). NCLB: Is there life beyond testing? *Educational Leadership, 64*(3), 8-12.

Guskey, T. R. (2014). Planning professional learning. *Educational Leadership, 71*(8), 10-16.

Hamdan, A. R., & Mattarima, K. (2012). Flexible differentiated instruction in heterogeneous classrooms as a destination of congruent curriculum. *International Conference on Education and Management Innovation, 30*, 280-285.

Heacox, D. (2012). *Differentiating instruction in the regular classroom: How to reach and teach all learners.* Minneapolis, MN: Free Spirit.

Holcomb, Z.C. (2016). *Fundamentals of descriptive statistics*. New York, NY: Routledge.

Howell, W. G. (2004). *The education gap.* Washington, DC: Brookings Institution Press

Huebner, T. A. (2010). Differentiated instruction. *Educational Leadership*, *67*(5), 79-81.

Joseph, S., Thomas, M., Simonette, G., & Ramsook, L. (2013). The impact of differentiated instruction in a teacher education setting: Successes and challenges. *International Journal of Higher Education, 2*(3), 28-40. doi:10.5430/ijhe.v2n3p28

Kalogrides, D., & Loeb, S. (2013). Different teachers, different peers: The magnitude of student sorting within schools. *Educational Researcher, 42*(6), 304-316. doi:10.3102/0013189X13495087

Kaminska, O., & Foulsham, T. (2013). *Understanding sources of social desirability bias in different modes: Evidence from eye-tracking* (ISER Working Paper No. 2013-04). Essex, England: University of Essex, Institute for Social and Economic

Research. Retrieved from https://www.iser.essex.ac.uk/research/publications /working-papers/iser/2013-04

Kim, J., & Seo, B. S. (2013). How to calculate sample size and why. *Clinics in Orthopedic Surgery, 5,* 235-242. doi:10.4055/cios.2013.5.3.235

Klein, A. (2015, April 10). No Child Left Behind: An overview. *Education Week.* Retrieved from http://www.edweek.org/ew/section/multimedia/no-child-left -behind-overview-definition-summary.html

Konstantinou-Katzi, P., Tsolaki, E., Meletiou-Mavrotheris, M., & Koutselini, M. (2013). Differentiation of teaching and learning mathematics: An action research study in tertiary education. *International Journal of Mathematical Education in Science and Technology, 44*, 332-349. doi:10.1080/0020739X.2012.714491

Krosnick, J. A. (1999). Survey research. *Annual Review of Psychology, 50,* 537-567. doi:10.1146/annurev.psych.50.1.537

Laitsch, D. (2005). NCLB meets school realities [Review of the book *NCLB meets school realities: Lessons from the field,* by G. L. Sunderman, J. S. Kim, & G. G. Orfield]. *Teachers College Record, 108*(1), 103-107. Retrieved from http://www.tcrecord .org/Content.asp?ContentId=12109

LeBlanc, D. (2004). *Statistics: Concepts and applications for science*. Sudbury, MA: Jones and Bartlett Publishers.

Levy, H. M. (2008). Meeting the needs of all students through differentiated instruction: Helping every child reach and exceed standards. *The Clearing House*, *81*(4), 161-164. doi:10.3200/TCHS.81.4.161-164

Little, C. A., McCoach, D. B., & Reis, S. M. (2014). Effects of differentiated reading instruction on student achievement in middle school. *Journal of Advanced Academics*, *25*, 384-402. doi:10.1177/1932202X14549250

Logan, B. (2011). Examining differentiated instruction: Teachers respond. *Research in Higher Education Journal, 13*. Retrieved from ERIC database. (EJ1068803)

Lund Research. (2013). *Cronbach's alpha using SPSS statistics*. Retrieved from https://statistics.laerd.com/spss-tutorials/cronbachs-alpha-using-spss-statistics.php

McQuarrie, L., McRae, P., & Stack-Cutler, H. (2008). *Differentiated instruction provincial research review*. Edmonton, Canada: Alberta Initiative for School Improvement.

Moon, T. R. (2005). The role of assessment in differentiation. *Theory Into Practice, 44*(3), 226-233. doi:10.1207/s15430421tip4403_7

Morgan, H. (2014). Maximizing student success with differentiated learning. *The Clearing House*, *87*(1), 34-38. doi:10.1080/00098655.2013.832130

National Assessment of Educational Progress. (2015). *The nation's report card.* Retrieved from https://www.nationsreportcard.gov

Newman, D., & Singer, M. (2012). Tool 12.4: Using a classroom-based coaching model to foster differentiated instruction. In J. Killion, C. Harrison, C. Bryan, & H.

Clifton, *Coaching matters.* Oxford, OH: Learning Forward. Retrieved from http://learningforward.org/docs/coachingmatters/killiontoolch12-4.pdf

Niño Santisteban, L. (2014). The effects of differentiated instruction on the literacy process of learners with interrupted schooling. *GIST Education and Learning Research Journal*, (9), 31-49

Nunnally, J. (1978). *Psychometric theory*. New York: McGraw-Hill.

Parsons, S. A., Dodman, S. L., & Cohen Burrowbridge, S. (2013). Broadening the view of differentiated instruction. *Phi Delta Kappan*, *95*(1), 38-42. doi:10.1177 /003172171309500107

Peifer, A. (2014). *The purpose of public education and the role of the school board.* Alexandria, VA: National School Board Association. Retrieved from http://www .nsba.org

Popham, W. J. (1999). *Using standards and assessments*. Alexandria, VA: Association for Supervision and Curriculum Development.

Robinson, L., Maldonado, N., & Whaley, J. (2014, November). *Perceptions about implementation of differentiated instruction.* Paper presented at the annual conference of the Mid-South Educational Research Association, Knoxville, TN. Retrieved from ERIC database. (ED554312)

Rock, M. L., Gregg, M., Ellis, E., & Gable, R. A. (2008). REACH: A framework for differentiating classroom instruction. *Preventing School Failure*, *52*(2), 31-47. doi:10.3200/PSFL.52.2.31-47

Ruys, I., Defruyt, S., Rots, I., & Aelterman, A. (2013). Differentiated instruction in teacher education: A case study of congruent teaching. *Teachers and Teaching, 19*(1), 93-107. doi:10.1080/13540602.2013.744201

Schwandt, T. A. (2007). *The Sage dictionary of qualitative inquiry* (3rd ed.). Thousand Oaks, CA: Sage.

Seidel, T., Blomberg, G., & Renkl, A. (2013). Instructional strategies for using video in teacher education. *Teaching and Teacher Education, 34*, 56-65. doi:10.1016/j .tate.2013.03.004

Smit, R., & Humpert, W. (2012). Differentiated instruction in small schools. *Teaching and Teacher Education, 28*, 1152-1162. doi:10.1016/j.tate.2012.07.003

Solem, R. C. (2015). Limitation of a cross-sectional study. *American Journal of Orthodontics & Dentofacial Orthopedics, 148*, 205-211. doi:10.1016/j.ajodo .2015.05.006

Solis, M., Vaughn, S., Swanson, E., & Mcculley, L. (2012). Collaborative models of instruction: The empirical foundations of inclusion and co-teaching. *Psychology in the Schools, 49*, 498-510. doi:10.1002/pits.21606

Spring, J. (2009). *Political agendas for education: For change we can believe in to putting America first* (4th ed.). New York, NY: Routledge.

Sternberg, R. J., & Zhang, L.-F. (2005). Styles of thinking as a basis of differentiated instruction. *Theory Into Practice*, *44*, 245-253. doi:10.1207/s15430421tip4403_9

Subban, P., & Round, P. (2015). Differentiated instruction at work: Reinforcing the art of classroom observation through the creation of a checklist for beginning and pre-service teachers. *Australian Journal of Teacher Education, 40*(5), 117-131. doi:10.14221/ajte.2015v40n5.7

SurveyMonkey. (2016). *Privacy policy: Effective date: September 12, 2016.* Retrieved from https://www.surveymonkey.com/mp/policy/privacy-policy/

Thomas, H. (1989). *Distributions of correlation coefficients*. New York, NY: Springer-Verlag.

Thompson, S. C., Gregg, L., & Niska, J. M. (2004). Professional learning communities, leadership, and student learning. *RMLE Online, 28*(1), 1-15. Retrieved from ERIC database. (EJ807417)

Tieso, C. (2005). The effects of grouping practices and curricular adjustments on achievement. *Journal for the Education of the Gifted, 29*(1), 60-89. doi:10.1177/016235320502900104

Tobin, R., & Tippett, C. (2014). Possibilities and potential barriers: Learning to plan for differentiated instruction in elementary science. *International Journal of Science and Mathematics Education, 12*, 442-443. doi:10.1007/s10763-013-9414-z

Tomlinson, C. A. (1995). *How to differentiate instruction in mixed ability classrooms.* Alexandria, VA: Association for Supervision and Curriculum Development. Retrieved from ERIC database. (ED386301)

Tomlinson, C. A. (1999). Mapping a route toward differentiated instruction. *Educational Leadership*, *57*(1), 12-16. Retrieved from http://www.ascd.org/ASCD/pdf /journals/ed_lead/el199909_tomlinson.pdf

Tomlinson, C. A. (2000). Differentiated instruction: Can it work? *Education Digest*, *65*(5), 25-32.

Tomlinson, C. A. (2005). Grading and differentiation: Paradox or good practice? *Theory Into Practice*, *44*, 262-269. Retrieved from https://www.jstor.org/stable/3497006

Tomlinson, C. (2013, March). *Differentiating instruction using Common Core Standards* [PowerPoint presentation]. Presented at Best Practices Institute Spring Workshop, University of Virginia, Charlottesville.

Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners.* Arlington, VA: Association of Supervision and Curriculum Development.

Tomlinson, C. A., & Imbeau, M. B. (2014). *A differentiated approach to the Common Core: How do I help a broad range of learners succeed with challenging curriculum?* Alexandria, VA: Association for Supervision and Curriculum Development.

U.S. Department of Education. (2015). *History of ESEA*. Retrieved from http://www.ed .gov/essa

University of Southern California. (2015). *Organizing your social sciences research paper: Quantitative methods.* Retrieved from http://libguides.usc.edu/c.php?g=235034&p=1561756

Valiandes, S. (2015). Evaluating the impact of differentiated instruction on literacy and reading in mixed ability classrooms: Quality and equity dimensions of education effectiveness. *Studies in Educational Evaluation, 45*, 17-26.

VanTassel-Baska, J. (2012). Analyzing differentiation in the classroom using the COS-R. *The Gifted Child Today, 35*(1), 42-48. doi:10.1177/1076217511427431

Vaughn, S., & Wanzek, J. (2014). Intensive interventions in reading for students with reading disabilities: Meaningful impacts. *Learning Disabilities Research & Practice, 29*(2), 46-53. doi:10.1111/ldrp.12031

Vygotsky, L. S. (1986). *Thought and language* (A. Kozulin, Trans.). Cambridge, MA: MIT Press. (Original work published 1934)

Ward, V. S. (1961). *Educating the gifted*. Columbus, OH: C. E. Merrill Books.

Watts-Taffe, S., Laster, B. P., Broach, L., Marinak, B., Connor, C. M., & Walker-Dalhouse, D. (2012). Differentiated instruction: Making informed teacher decisions. *The Reading Teacher, 66*, 303-314. doi:10.1002/TRTR.01126

Wormeli, R. (2012). Making the most of professional development. *Middle Ground, 15*(3), 38-39.

Wu, E. H. (2013). The path leading to differentiation: An interview with Carol Tomlinson. *Journal of Advanced Academics, 24,* 125-133.

Appendix A: TAPS: Differentiated Instruction Rubric

Teacher Self-Assessment Checklist

Performance Standard 4: Differentiated Instruction

Quality		Ex		Pr	ds		In	
Differentiating Content	Increase the breadth of learning materials to enhance student learning motivation.							
	Offer students choice regarding the complexity (depth) of content they want to start with so that they can experience academic success.							
	Offer multiple modes of learning for students to be exposed to the target content through their learning-style preferences (such as reading, listening, or doing).							
	Reteach an idea or skill in small groups of struggling learners.							
	Extend and enrich the thinking or skills of advanced learners							
Differentiating Process	Vary instructional strategies and activities for students.							
	Vary types of assignment to assess student learning.							
	Routinely combine instructional techniques that involve individual, small-group, and whole-class instruction.							
	Monitor and pace instruction based on the individual needs of students.							
	Draw on a mental database of examples, metaphors, and enrichment ideas to provide personalized scaffold.							
	Offer optimal amount of support/intervention and structure learning tasks to ensure the learning demand is appropriately challenging.							
Differentiating Product	Provide students with choices regarding the method to express required learning, such as presentation, portfolios, or formal tests.							

Quality		Ex	–	Pr	ds	In
	Use rubrics that match and extend students' varied ability levels.					
	Encourage students to produce their own product assignment.					
	Allow students to work alone or in small groups on projects.					
Learning Environment	Create an environment in which student differences in ability, cultural background, academic needs, and interest are respected and treated as assets.					
	Know and understand students as individuals in terms of ability, achievement, learning styles, and needs.					

Note. Each item receives a score of 0 for Level I, representing no use of knowledge of the practice; 1 for Level II, indicating inconsistent practice; 2 for Level III, indicating consistent demonstration of the practice and needs of students; and 3 for Level IV, indicating continual use of content and pedagogical knowledge. From *Teacher Keys Effectiveness System Fact Sheets*, by Georgia Department of Education, 2014, p. 32, Atlanta, GA: Author. In the public domain.

Appendix B: Survey Questions

This survey is confidential, so please answer honestly and completely.

Demographics

1. What is your gender?

Male Female

2. How many years have you been teaching?

3. What, if any, specialty do you teach?

Differentiated Instruction Impact

4. In your own words define differentiated instruction.

5. Do you use differentiated instruction in your classroom? If so, for how many years?

6. What differentiated instructional techniques do you utilize in your classroom?

For the following statements, please rate how much you personally agree or disagree with these statements—how much they reflect how you feel or think personally. Strongly disagree = 1, disagree = 2, Neutral = 3, Agree = 4, Strongly agree = 5	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
7. Differentiated instruction improves teaching.					
8. Differentiated instruction improves student engagement in learning.					
9. Differentiated instruction improves student achievement.					
10. Differentiated instruction improves management of the classroom environment.					
11. I have been successful in implementing differentiated instruction techniques in my classroom.					
12. Differentiated instruction should be implemented in all classrooms.					

13. How can the concept of differentiated instruction be improved?

14. What are the greatest barriers to your full implementation of differentiated instruction in your classroom?

15. What other comments would you like to provide regarding differentiated instruction?