THE OPPORTUNITY GAP: RURAL GIFTED STUDENTS LEFT BEHIND

A Dissertation
by
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Abstract

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When several school districts in North Western North Carolina removed the chance for advanced students to take a high school math course in 8th grade, it increased the opportunity gap with their urban peers. A review of the literature on gifted education revealed a need for research in differences in opportunities for gifted students based on the context of the districts they attend. This study addressed the following questions:

(1) What are the effects of context of public school districts on the design and implementation of gifted programming?

(2) What are the effects of differences in design and implementation of gifted programming on gifted student outcomes?

(3) What are the effects of public school district capacity and resulting allocation of resources on gifted student outcomes?

Results revealed significant differences in the percent of students identified, opportunities available in the district, financial resources, and learning outcomes for gifted students among urban and rural school districts. Urban school districts have distinct advantages with more students identified compared to their annual daily membership, more opportunities and financial resources for gifted students, and more students in the AIG subgroup scoring level 5's on the North Carolina End of Grade and End of Course tests than rural school districts. The advantage is clear with the study also finding significant correlations between opportunities and learning outcomes; financial resources and percent of students identified; financial resources and opportunities; and financial resources and learning outcomes. The higher percentage of opportunities available or the greater the financial resources the more level 5's scored by the AIG subgroup. The more financial resources the more opportunities and percent of students identified. There are implications of inequities in identification and opportunities and the need for leaders prepared to lead change beginning with opening their own minds and leading by example. The use of local norms or elimination of test-based identification and a move to MTSS for identification is proposed. To equalize opportunities without more funding, authentic differentiation, acceleration, and individualized learning through MTSS is suggested.

Acknowledgments

I would like to start by thanking my chair and committee members. Dr. Barbara Howard, you believed in me and my crazy timeline from the beginning of the process and read and reread my multiple drafts without complaint. Your editing skills are out of this world and thank you for always being available even if I just needed to talk something through or needed a break. Dr. Tracy Goodson-Espy, thank you for not only serving on my committee but teaching me the statistics needed to complete my research.

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Jessica and Chase, you have been there from the Master's Degree where most of the work was done while you were sleeping. Wanting to make you proud and show you that all

dreams are possible has motivated me from the beginning. Don't ever stop setting higher goals and doing everything you can to reach them. I love you both to infinity and beyond!

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Frank, there is no way I could thank you for everything you do for me. You are my life, my heart, my everything. You made it possible for me to write from porches with lake views, mountain views, and springtime in February views. I know without you I would never have completed this degree. You cooked my dinner and served it from the side while I was in online classes and rode with me five hours each way to get me to face to face classes from Savannah. You encouraged, helped, loved, and took care of me through all of this. I would have to write a longer paper than this dissertation to thank you for everything, so I will just say: Thank you my love, my partner, my life.

Dedication

For Raymond Wayne and Betty Lou Hamby who taught me to believe I could have it all and for Frank for giving it to me.

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Chapter 1: The Opportunity Gap

With the current focus on addressing low performing populations, the gifted may be lost in the discussion. Yet, without appropriate educational opportunities, our most talented students are in danger of also under-performing and being left behind. The danger may increase when a student is in a rural district. With the loss of teachers exclusively teaching gifted students and the increasing class sizes in 4th grade and up, meeting the needs of rural gifted students is being overlooked (Azano, Callahan, Broderson, & Caughey, 2017; Brown & Garland, 2015; Wu, 2017).

Wu (2017) suggests many of the proven strategies of meeting gifted students needs have been abandoned for what is easiest for overworked teachers, what will least upset the community, and what will provide the best chance on meeting goals on testing requirements. This study is designed to bring awareness to the plight of rural gifted students who spend most of their days in regular education classrooms where they may learn at a faster rate or already know the curriculum on the first day of school and thus become bored or disengaged as their peers catch up (Azano, et al., 2017; Brown & Garland, 2015; Wu, 2017).

In Northwestern North Carolina, during the 2018-2019 school year, four rural school districts discontinued the opportunity for advanced students to take NC Math I (previously Algebra I) in 8th grade. These courses are primarily taken by students identified as Academically and/or Intellectually Gifted (AIG) (NCDPI, 2018a). Allowing the opportunity for students to complete the credit for NC Math I in middle school allows room in their high school schedules to pick up more advanced math courses, which enhances their college applications without having to take more than one higher level math course during a semester or academic year. Another advantage of offering NC Math I to middle school students is that AIG high school students may have the opportunity to take more advanced classes or take college courses, if offered in the district. Instead of removing the opportunity to take the course in middle school for identified *gifted* students, Borland (2003) suggests *all* students should be allowed the opportunity.

Borland (2003) also indicates inconsistencies in the definition of gifted and the way measures are used to make identification decisions have resulted in inequities. Review of the literature suggests that the definition of giftedness and measures used to determine if one meets this definition have been the topic of research papers since Galton (1869) did the first scientific study on what he called *geniuses*. Dai and Chen (2013) in discussing the discrepancies and disagreements not only on the identification of gifted students but also on the best way to meet their needs stated, “Solving the problems of the means is impossible if we cannot even agree on what ends the means serves” (p. 152). Gallagher (2015) as well as Brown and Garland (2015) advocated that educators should provide for gifted students’ needs as they provide for struggling students’ needs. Furthermore, all gifted students should be challenged and offered an equal opportunity to grow (Gallagher, 2015; Brown & Garland, 2015).

Kettler, Puryear, and Mullet (2016) suggests that in rural districts meeting these needs can be hindered by funding. Kettler, Russel, and Puryear (2015) determined the strongest predictors of a variance in funding and staffing for gifted students were the locale (city, suburban, town, and rural), school size, and the number of economically disadvantaged students. The next year, Kettler, Puryear, and Mullet (2016) called for more research on the difference in opportunities between urban and rural students citing a need to distinctly define rural.

Azano et al. (2017) and Hernández-Torrano (2018) discuss these differences or *opportunity gaps* exist when there are significant discrepancies among a state's public school districts in the identification, programming and resources offered to gifted students. The purpose of this study is to examine the extent to which such opportunity gaps exist between rural and urban North Carolina school districts for the subgroup of gifted students to suggest recommendations to assist district leadership in closing what Azano et al. (2017) and Hernández-Torrano (2018) describe as the *excellence gap*.

Examining the identification, services, and resources established in different districts to meet the needs of gifted students allowed a comparison of diverse districts leading to a discovery of relevant inequities that might affect academic outcomes resulting in an *excellence gap*, which denotes a difference in the learning outcomes of identified gifted students in rural versus urban schools (Azano et al., 2017; Hernandez-Torrano, 2018). The learning outcomes of gifted students addressed by this study include the percent of students meeting the ACT benchmarks scores and the percent of the *AIG* subgroup scoring level 5s on North Carolina End of Grade (EOG) and End of Course (EOC) tests.

This study focuses on a comparison of the identification systems and services for AIG students in larger urban districts and smaller rural districts in one southeastern state over the course of the past decade. The study then considers any differences found and possible relationships with financial resources and learning outcomes. Based on the discrepancies of educational opportunities for gifted students among districts resulting from locale, size and funding levels, an outcome of this study is feasible recommendations proposed in terms of leadership and policies.

This quantitative research project uses a non-experimental comparative correlational design (Price, Jhangiani, Chiang, Leighton, & Cuttler, 2017) to explore opportunity gaps and inequities among North Carolina gifted students attending schools in rural versus urban districts. Price et al. (2017) describe how non-experimental research does not manipulate variables but "uses them how they naturally occur" (p. 102). For this study, rural districts were designated by the National Center for Educational Statistics (NCES) as having locale ratings of 31 to 43 while urban districts have locale ratings of 11 to 23 (NCES, 2019). The study used the designation already provided by NCES as a basis of comparison.

Identification, opportunity, financial resource, and learning outcome variables are compared among urban and rural districts and correlational research is used to seek any relationships among these variables. Correlational research is a type of non-experimental research that compares two continuous variables and examines their relationship. Since correlational research does not control for extraneous variables it cannot give causal effects, only statistical relationships between variables (Price et al., 2017).

To answer the following questions:

(1) What are the effects of context of public school districts on the design and implementation of gifted programming?

(2) What are the effects of differences in design and implementation of gifted programming on gifted student outcomes?

(3) What are the effects of public school district capacity and resulting allocation of resources on gifted student outcomes?

the study explores inequities in identification, programming, and financial resources associated with gifted students in rural and urban North Carolina school districts and

examines data for North Carolina’s gifted students’ subgroup identifying some significant differences among rural or urban school districts in the percent of ACT benchmarks met or the percent of the AIG subgroup scoring level 5’s on NC EOGs and EOCs. The study then analyzes detected inequities in identification, programming, financial resources, and learning outcomes and uncovers significant relationships between attending rural or urban schools and the inequities.

Chapter 2: Literature Review

Dai and Chen (2014) suggest that the field of gifted education needs "conceptual clarity . . . (and) clarity, rigor, and relevance in research and practice" (p. 57). They identified three paradigms of gifted education (gifted child paradigm, talent development paradigm, and differentiation paradigm) to attempt to give researchers and educators a common conceptual clarity of the field. The gifted child paradigm is defined by identifying students using intelligent quotient (IQ) tests and grouping gifted students if they score in a predetermined top percentile. The shift to the talent development paradigm brought multiple measures for identification and more of a focus on programming and serving students based on their domain of giftedness. Current theories are beginning to shift to the differentiation paradigm that looks at individualizing instruction to meet each students needs.

Such a paradigm of educational practice seeks not to simply answer the questions of *what* and *why* but also the *how* and *who* (Dai & Chen, 2013, 2014). Renzulli (2016a), when reflecting on his *Three-Ring Conception of Giftedness* first published in 1978, suggests the field of gifted education focuses on two major concepts. The first is defining giftedness (*what*) or identifying *who* has giftedness, and the second is *how* to best develop giftedness or to best serve (*why*) those identified as having giftedness.

As the field of gifted education has developed over the last 150 years, there have been some disagreements over the what, why, who, and how within each theory or definition, but Dai and Chen's (2013, 2014) paradigms are a useful tool to organize and understand gifted education theory. Framed by these paradigms, this chapter first looks at the historical theories and practice in the field of gifted education and then the historical research and policies that helped develop the current policies, theories, and practices today. A review of the literature on those current policies, theories, and practices follows. The chapter concludes by framing the study with current theories and literature around the identification and needs of AIG students.

Historical Theories and Practices

Gifted education has a long history, perhaps dating back to the nineteenth century, although those in the field do not always agree upon exactly when it began or even the best theory of gifted education (Dai & Chen, 2013, 2014; Plucker & Callahan, 2014; Van Tassel-Baska, 2018). Plucker and Callahan (2014) dated the field to over 100 years ago in the United States with the establishment of schools for bright students and credit Galton (1869) with the first scientific study of high ability and achievement. Dai and Chen (2013, 2014) indicate the field of gifted education began with Terman (1926) and Hollingworth (1926) in the 1920s. Terman's (1926) work can be traced back to Galton (Dai & Chen, 2013. 2014). VanTassel-Baska (2018) indicates that although there were some sparse and uneven gifted education practices after the compulsory schooling laws in the mid-1800s, the field of gifted education in the United States began with the launch of Sputnik by the Soviet Union in 1957 and interest in advancing the United States in the space race.

The race to the moon resulted in schools across the nation embracing the identification of advanced students and a scramble to launch advanced courses, offer acceleration to early college entrance, and increase science, foreign language, and technology curriculum to meet the needs of these identified students (VanTassel-Baska, 2018). The National Defense Education Act (NDEA) of 1958 was a direct result of the Soviet Union's Sputnik launch and had a primary purpose of strengthening science instruction at all school levels (Marland, 1973).

Gifted Child Paradigm

Birth of the Intelligent Quotients (IQ) Tests. Galton (1869) used the word *genius* instead of *ability* because ability did not exclude the effects of education. His work categorized man's intellectual limits based on heritage using the first standard scale of mental faculties. When the book was reprinted twenty-three years later in 1892, Galton used Johnson's Dictionary to define genius as, "a *man* (not emphasized in quote) endowed with superior faculties" (p. viii).

The first scientific research on intelligence, Galton's (1869) work was the precursor for the Binet-Simon Test (1905) that revealed a child's mental age (Plucker & Callahan, 2014). Galton (1892) was looking for a way to determine if someone was a genius, but Binet and Simon (1905/1916) were looking for a way to identify children who had mental disabilities (McCredie, 2017). From 1905-1911 they performed research in France on children with normal intelligence and those they described as being in an "inferior state of intelligence" (Binet & Simon, 1905/1916, p. 9). An inferior state of intelligence seems flattering, if you consider that in the "subnormal" end of their scale they used "morons," "imbeciles," and called the lowest "idiots" (Binet & Simon, 1905/1916, p. 10). Although their "experimental protocol," including the "subjugation of asylum inmates," (Le Sonn, 2017, p. 567) called their methods and results into question, Binet and Simon (1905/1916) and German psychologist William Stern (1914) applied the Binet-Simon scale to find a child's mental quotient, which became the forerunners for Terman's (1916) development of the Stanford-Binet Intelligence Scales (Dai & Chen, 2013, 2014; McCredie, 2017; Plucker & Callahan, 2014).

Terman (1916), a psychologist at the Stanford Graduate School of Education in California, proposed that the Binet-Simon Scale (Binet & Simon, 1905/1916) be used to determine the intelligence of children in the United States (McCredie, 2017). Terman (1916) made changes to the Binet-Simon scale including eliminating or relocating most of the 54 original tests and establishing new tests for 14-year olds and adults. He used Stern's (1914) mental quotient or the ratio of mental age to chronological age and multiplied it by 100 to define the "*intelligent quotient (IQ)*" (Terman, 1916, p. 53). He claimed the scores were not related to education and one's place on the scale would not change with age. His taxonomy for IQ testing is similar to many in use today (McCredie, 2017).

Using IQ testing to form groups of gifted students. In 1922, Terman (1926) began trying to find mentally superior children from the state of California in all age groups to use as subjects in a longitudinal study. Terman (1926) grouped these *gifted* students with IQs in the top 5% of their peers and collected data on 1,444 children with extensive data collection on the main experimental group of 643 students, attempting to determine the genetic make-up of a genius. Even though Terman died in 1956, his research assistants and students continued to collect and update the data which is available digitally on a website and has been used in published gifted education research as late as 2017 (McCredie, 2017; Terman, 2018).

Terman (1926), whose IQ testing and establishment of the ability to identify a group of gifted students has impacted gifted education for over 90 years, claimed his motivation was "the betterment of the human race" (Dai & Chen, 2013, p. 154). He believed we can identify children who are "qualitatively different" (Dai & Chen, 2013, p. 155) from everyone else and we should identify and serve these children to enable them to lead us to a bright future in our society

During the middle 1920s while Terman (1926) was conducting his study in California, Hollingworth (1926) was also studying the use of IQs to categorize children in the state of New York. Like Terman, she advocated the categorizing of children into *gifted* groups, but, unlike Terman, her motivation was not so the children could help the greater good (Dai & Chen, 2013). She wanted to group gifted children for educational purposes or *gifted education* and to focus on the "wellbeing of these children themselves" (Dai & Chen, 2013, p. 154).

Conclusions on Gifted Child Paradigm. Although Terman and Hollingworth did not agree on why they wanted to identify and categorize gifted students, they both agreed that giftedness is an inherent quality that can be measured by an intelligence test (Dai & Chen, 2013). This idea forms the basis for the *gifted child paradigm* where giftedness is defined as a hereditary ability that can be identified by a test. According to Terman (1916), even though "through the handicapping influences of poverty, social neglect, physical defects, or educational maladjustment [a gifted child can be] denied the opportunity of a normal development" (p. 12), these handicaps would not affect their IQ or ability. Instead such circumstances only affect the manifestation of that ability. Terman (1916) argued that even if the ability is not nurtured and never manifests, the IQ of the child will remain almost the same throughout their lives.

The argument of whether one can be identified gifted by scoring above a certain percentage of one's peers on an intelligence test continues today (Dai & Chen, 2013). The percentage cutoffs are usually arbitrary with Terman using 3% to 5% depending on which school the students attended (Dai & Chen, 2013; Hertzog, 2009). The National Association for Gifted Children (NAGC) proposed the top 10% in the early 2000's and still use this percentage in their definition of giftedness on their website today (Dai & Chen, 2013; National Association for Gifted Children, 2019).

Most theories and research followed the gifted child paradigm until the late 1960s. An issue with the definition of giftedness began many researcher's paradigm shift that would not become a movement until the 1980s and 1990s. Opponents of the gifted child paradigm were not happy that the IQ-based definition did not identify giftedness in a specific domain. Renzulli (1978) led the way along with researchers working on multiple and multidimensional intelligences and other leading researchers in the field of gifted education including Bloom, Feldhusen, Gagné, and Tannenbaum (Dai & Chen, 2013; Plucker & Callahan, 2014).

Talent Development Paradigm

In the 1990s researchers began to realize that they could not rely on intelligence tests only to identify students as gifted. They were discovering children who were mathematical geniuses or could play a piano extremely well but could not score in the top 10% of their peers on intelligence tests (Dai & Chen, 2013). Superior intelligence was being used to define giftedness and any new definitions were based on the past 100 years of study which mostly only dealt with ability or intelligence as measured by a test (Renzulli, 2016a). Many started questioning "a pure IQ conception of giftedness" (Renzulli, 1990, p. 309).

Gould (1981) suggested there were fallacies in the statistical methods and cultural motivations used in determining IQs and ranking students based on the IQs. In a revised edition of his book, Gould (1996) indicated society used the faulty idea of quantifying "intelligence as a single number" (p. 56) and then using "these numbers to rank people in a single series of worthiness" (p. 57) to justify "oppressed or disadvantaged groups - races, classes, or sexes – are innately inferior and deserve their status" (p. 57). Although he was praised for opposing racism, his idea that IQs should not be used to rank people was in direct opposition to leading psychologists like Terman (1916, 1926).

Sternberg (1984), Gardner (1983) and others had developed new models for identifying someone as *gifted* (Renzulli, 2016a). Led by Renzulli (1978), others such as Bloom (1985), Feldhusen (1992), Gagné (1985), and Gallagher (2000) began looking at not only defining and identifying giftedness in a new way but looking at models that addressed how to best serve students who were not only "schoolhouse gifted" (Renzulli, 2016a, p. 63).

Models to define and identify giftedness. Renzulli's (1978) three-ring conception of giftedness is one of the most well known in the field. Although there are critics of the approach, they do not always consider the revisions and improvements on the model over the years, including one by Renzulli and D'Souza (2014) in the last four years. The approach focuses on the interaction between high-ability, creativity, and motivation and includes a houndstooth background in the graphic representation (see Figure 1) to represent personality and environmental influences (Renzulli, 1978).

Gagné's (1995, 2000, 2004) theory and development of the Differentiated Model of Giftedness and Talent (DMGT) added to the definition by separately defining gifts and talent. *Gifts* are innate abilities measured as being better than 90% of one's age peers in at least one domain. *Talent* is "the demonstrated mastery of the gift" (Plucker & Callahan, 2014, p. 392) in a real-world situation better than 90% of one's peers. One could be gifted in math, but not talented, which defines *underachievement*.

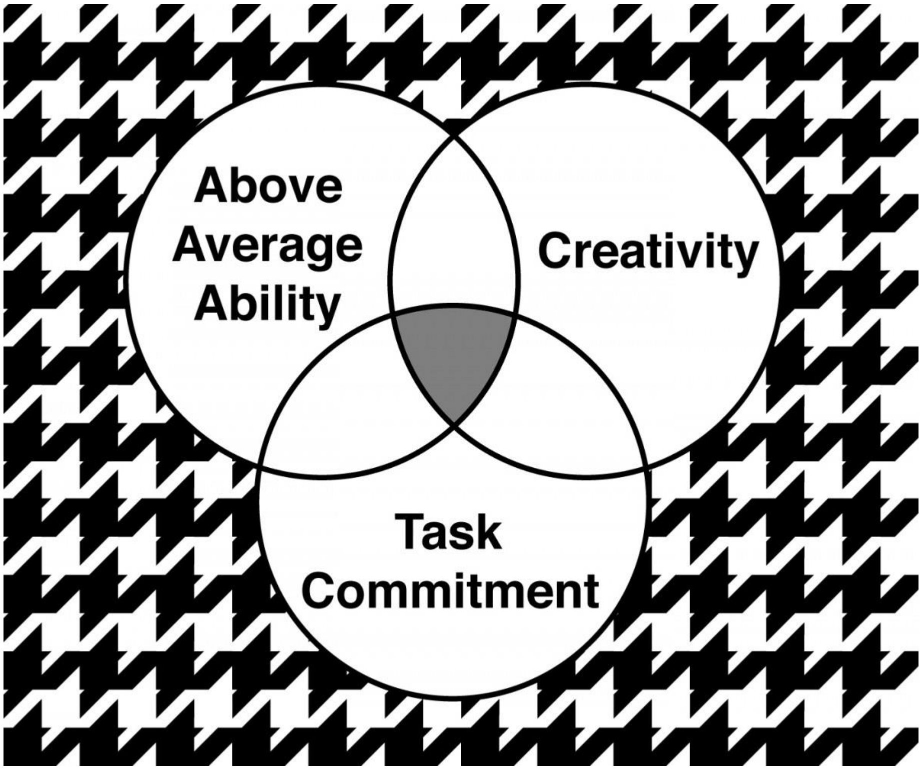

Figure 1. The graphic representation of Renzulli's (1978) Three-Ring Conception of Giftedness with the houndstooth background used to represent personality and environmental issues (University of Connecticut, 2019a)

Sternberg (1984) studied the analytical, creative, and practical aspects of intelligence and developed his triarchic theory of intelligence. He concluded that intelligence is not just about the amount of ability in each of these aspects but can also be about the way one balances those abilities (Sternberg & Grigorenko, 2002). Sternberg (1996) argued, "The notion of someone's being gifted or not is a relic of an antiquated, test-based way of thinking" (p. 197). Intelligence is about becoming an expert in one or more domains of real-life, therefore, one can be gifted in one domain but not in another (Sternberg & Grigorenko, 2002).

The idea of real-life influencing giftedness continued with Gardner's (1983, 1999) development of his Multiple Intelligences theory around eight ability models. The models include the following: abilities with language; logical-mathematical intelligence; visual-spatial intelligence; bodily-kinesthetic intelligence or being able to coordinate the body; musical-rhythmic intelligence; interpersonal intelligence or the ability to understand the needs of others; intrapersonal intelligence or the ability to understand oneself and your own needs; and naturalist intelligence or the ability to understand nature (Gardner, 1983, 1993, 1999).

Other researchers in gifted education spent time on multiple intelligences and the true definition of giftedness from the late 1970s to the present including Bloom (1985), Gallagher (2000), Passow (1985), Piirto (1994), Subotnik and Olszewski-Kubilius (1997) and Tannenbaum (1983, 1986). Although they often use different vocabulary (abilities, talents, domains, intelligence, giftedness, talent) to express their theories, their work still focuses around “domain excellence… as the goal of gifted education in the talent development paradigm” (Dai & Chen, 2013).

Meeting the needs of the identified gifted students. Before he looked at defining giftedness and identifying students with the Three-Ring Conception Model, Renzulli (1978) had already been exploring how best to serve identified gifted students. Renzulli’s (1976,1977) Enrichment Triad Model or Triad (see Figure 2) is a learning theory developed to be a guide for planning programming to address the creative productive side of giftedness. Triad (Renzulli, 2012) is based on the theory that “learning exists on a continuum ranging from deductive, didactic, and prescriptive approaches at one end to inductive, investigative, and constructivist-based approaches at the other” (p. 153).

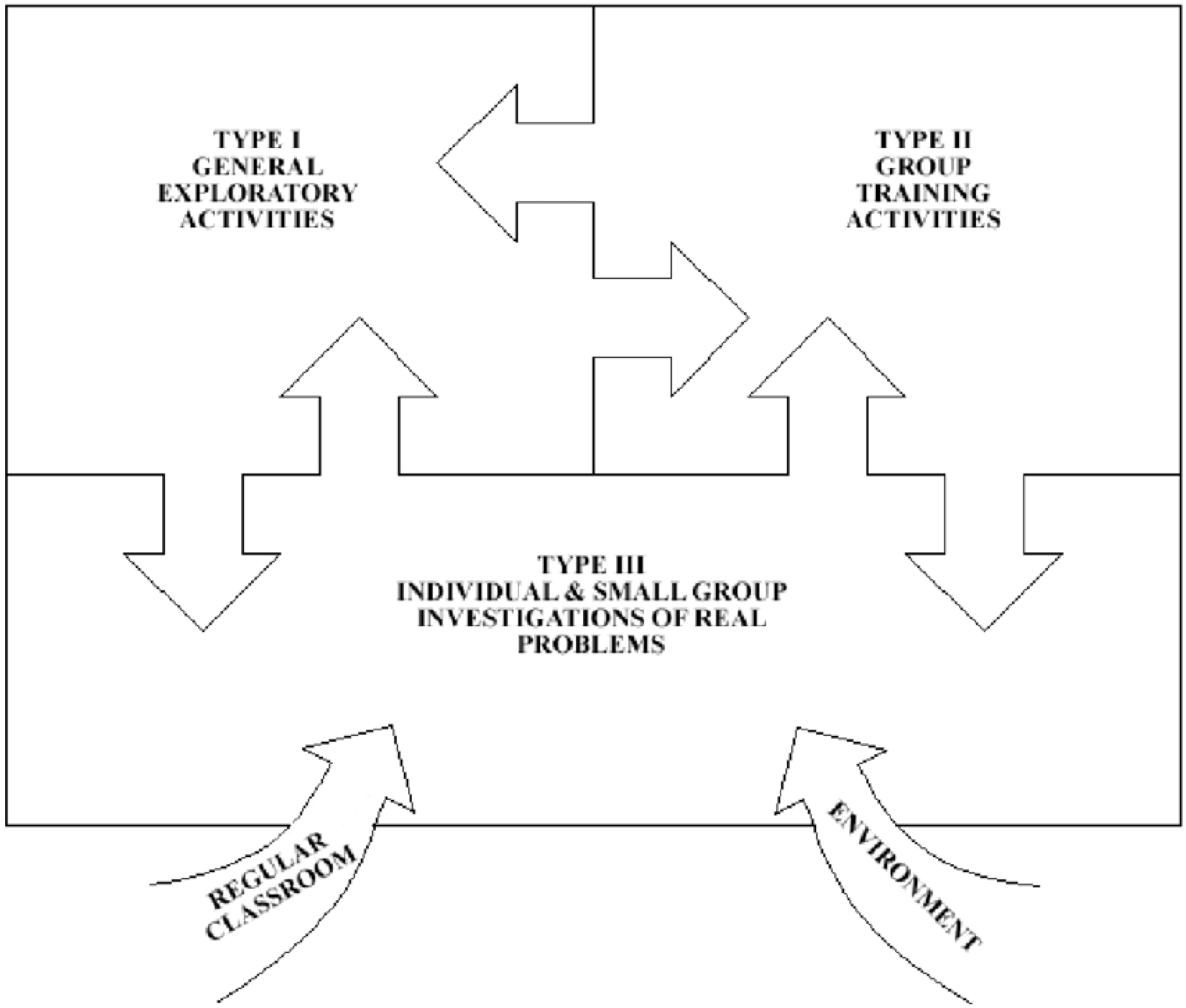

Figure 2: Renzulli's (1976, 1977) Enrichment Triad Model. The arrows represent how all three types of learning influence and inform each other (University of Connecticut, 2019b)

Type I of the triad involves general exploratory activities. Type II focuses on group training activities while Type III focuses on individuals and small group investigations of real-world problems. All pieces of the Triad are designed to work together (Renzulli, 1976, 1977). Uniquely, practice research has been done on the student-centered model originally designed for pull-out programs (Renzulli, 1976, 1977) numerous times in the last thirty years (Renzulli, 1984, 2016b).

Feldhusen and Kolloff (1988) would add on to Renzulli's (1976, 1977) Enrichment Triad Model to attempt to meet the needs of students who were gifted but did not have high IQs and could not accelerate. They designed the Three-Stage Enrichment Model (Feldhusen & Kolloff, 1988) for the student whose "IQ" may be in the range 110 through 140 and may have creative or expressive talents and abilities" (Feldhusen & Kolloff, 1988, p. 14).

In an attempt to meet the diverse needs of gifted students, Reis and Renzulli (1984) would combine the Enrichment Triad Model theory with a new identification program developed by Renzulli and his colleagues called the Revolving Door Identification Model or RDIM (Renzulli, 1984; Renzulli, Reis, & Smith, 1981). RDIM is a way of serving a percentage of a school's population instead of a percentage of students who scored the highest on an IQ test. For example, a small school with a population of 200 might serve 10% or 20 students. The 20 *slots* (not students) would be used to serve students who become "inspired by a particular topic, area of study, issue, event, or form of creative expression" (Renzulli, Reis, & Smith, 1981, p. 648). This idea is easily related to Type III in the Triad model, which utilizes individualized or small group instruction to explore real-life problems (Renzulli, 2012). Delisle and Renzulli (1982) explain that although RDIM (Renzulli, Reis, & Smith, 1981) incorporates Renzulli's (1978) Three-Ring Conception of Giftedness, it is more focused on the belief "that a relatively large proportion of persons manifests gifted behaviors at certain times, in certain areas of study, and under certain circumstances" (p. 90).

Over the next several decades, Renzulli and his colleagues would endeavor to meet the changing needs of gifted students in the 21st century by refining, revising, testing, and developing new theories (Dai & Chen, 2013, Renzulli, 2016a; Renzulli & Gaesser, 2015).

The results would be the Schoolwide Enrichment Triad Model or SEM (Renzulli & Reis, 1985) and the Four-part Theory of Talent Development (Renzulli, 2012).

Schoolwide Enrichment Triad Model. Field testing and further research on the Triad/RDIM program model (Renzulli, Reis, & Smith, 1981) resulted in the development of SEM (Renzulli & Reis, 1985). The pull-out model was field tested for over 15 years by researchers and practitioners all over the world. In 1994, Renzulli and Reis summarized the research up to that point. Overall, although most research was nonexperimental and descriptive and therefore not able to predict causation, the SEM model was deemed to be successful and could be used to meet the needs of gifted students (Renzulli & Reis, 1994). Results indicated most students, parents, teachers, and administrators had positive perceptions of the effectiveness of SEM. The program had political advantages including classroom teachers becoming more involved in gifted students' education and more positive attitudes toward the gifted program (Renzulli & Reis, 1994).

Four-part Theory of Talent Development. The Four-part Theory of Talent Development (see Figure 3) combines the Three-Ring Conception of Giftedness, the Enrichment Triad Model, Operation Houndstooth, and Executive Functions to form a framework of talent development for use in the 21st Century (Renzulli, 2012).

Renzulli (2002, 2012) further developed the personality and environmental influences represented by the houndstooth background in the graphic (see Figure 1) of his Three-Ring Conception of Giftedness (Renzulli, 1978) into Operation Houndstooth – Gifted Education and Social Capital (see Figure 4). Operation Houndstooth (Renzulli, 2012) looks at how to develop characteristics including "optimism, courage, romance with a topic or

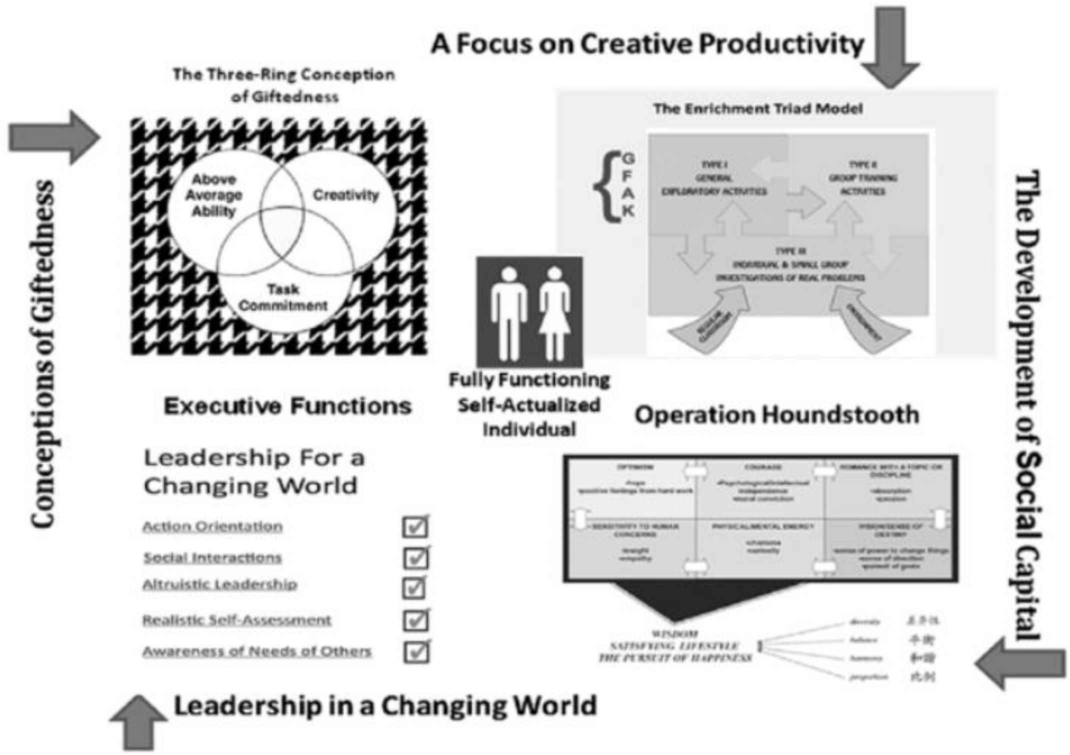

Figure 3: Four-part Theory of Talent Development (Renzulli, 2012). The individuals in the middle represent the student-centered approach with the Three-Ring Conception of Giftedness (see figure 1 above), The Enrichment Triad Model (see figure 2 above), Operation Houndstooth (see figure 4 below) and the Executive Functions all affecting the individual (Renzulli, 2012, p.152)

discipline, physical and mental energy, vision and a sense of destiny, and a sence of power to change things" (p. 156).

Executive Functions-Leadership for a Changing World (Renzulli, 2012) was introduced as part of the Four-Part Theory. Renzulli (2012) suggests the other models develop students' creativity, analytical abilities, and motivations, but for these characteristics to result in successful leaders of our society, "skills such as organization, sequencing, and sound judgment" (p. 156) must be developed and students taught to apply those skills in problem situations in the real world. Renzulli (2012) hopes to develop gifted students who will apply the opportunities offered by the Four-part Theory of Talent Development and use them to make a difference in the world. According to Renzulli (2012), the program

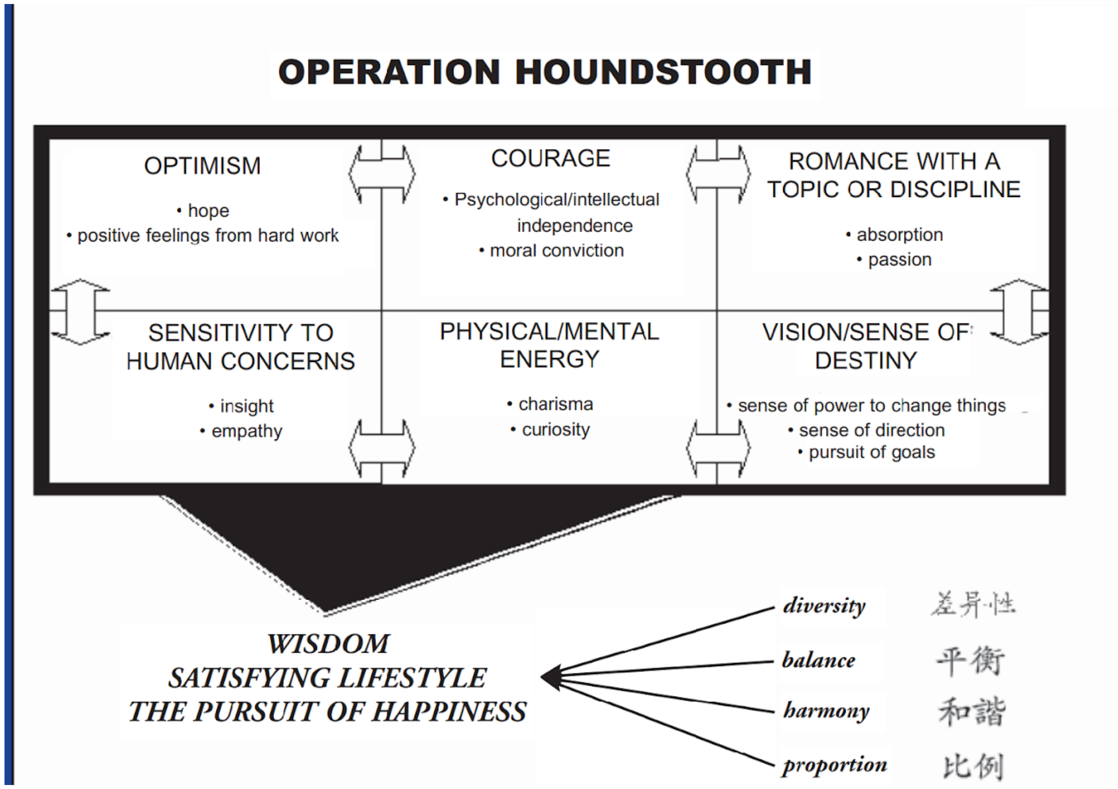

Figure 4: Renzulli's (2002) Operation Houndstooth graphic with the arrows representing how any or all of the factors might be influencing a student's learning at any time (Renzulli, Koehler, & Fogarty, 2006, p. 17).

involves teaching gifted students to use their "intellectual, motivational, and creative assets in ways that lead to outstanding manifestations of achievement and creative productivity" (p. 152).

Conclusions on Talent Development Paradigm. Regardless of where the theorists of the talent development paradigm differ, they all concur that intelligence (IQ) tests may predict how students will perform but IQ tests should not be the only predictor of academic success. The ideas that a student might not perform well on an IQ test but still be gifted and that a student could be gifted in one area but not another have been the driving force behind the development of theories to identify and serve gifted students since the early 1990s (Dai &Chen, 2013; Plucker & Callahan, 2014; Renzulli, 2016a).

The talent development paradigm goes beyond the IQ test as an indicator of giftedness. The models and theories look at multiple measures but almost all still include an IQ test result as a piece of their identification process (Gagné, 2013; Renzulli, 2016a), either as a screener or as one of the domains of identification (Dai & Chen, 2013; Plucker & Callahan, 2014). Researchers in this paradigm first looked at different domains of giftedness besides intelligence and how factors such as environment and motivation might affect identification. The main intent of most models in the paradigm is not excluding students from accessing programming opportunities but looking at different approaches for identifying students as gifted and giving more inclusive access to programming opportunities (Gagné, 2013; Gallagher, 2000; Renzulli, 2016a).

As opposed to the gifted child paradigm, the talent development paradigm is more focused on programming. Instead of just using grade acceleration for students with high IQ scores the focus is on matching programming with the domain of identification (Dai & Chen, 2013). For example, programming might include pull-out, differentiation, or one of the 19 different types of acceleration discussed later in this chapter (Colangelo, Assouline, Gross, & Iowa University, 2004). The models involve mostly pulling identified students out of their regular classroom for interventions that motivate their creativity and production in the domain or domains in which they are identified gifted (Dai & Chen, 2013). The focus of programming for students in this paradigm is helping them develop excellence in their domain of giftedness, although most differ in how they define these domains. In order to serve a more diverse and inclusive clientele, the models in the talent development paradigm attempt to provide a broader range of opportunities that are in-depth domain and interest-based learning experiences (Dai & Chen, 2013, p. 157).

Theories from the talent development paradigm are still some of the dominating practices in the United States today (Dai & Chen, 2013). Understanding these theories and what makes new theories agree or disagree with this paradigm will be important as I review and critique current literature. The theories from the talent development paradigm were the building blocks for gifted education policy in the United States. They broadened educators' views of who is gifted and talented and began the process of considering the role of sociocultural context in identifying and serving gifted students (VanTassel-Baska, 2018).

Differentiation Paradigm

Several of the talent paradigm theorists, Renzulli (2012) for example, have revised old or developed new theories that relate more to the differentiation paradigm. As gifted education policies that addressed identification, programs/services, professional development, and assessment and evaluation were emerging and disappearing at the state levels, new theories were also emerging. "Although explicit paradigmatic prescriptions about needs-based differentiation did not emerge until" (Dai & Chen, 2013, p. 157) the 2010s, the idea of differentiating for individual needs had been discussed since the 1980s. Led by preeminent voices in the field like Coleman and Gallagher (1995) and Gallagher (1979), others began to question if special education addressed the needs of low achieving students individually, why were gifted students' needs not addressed individually (Brown & Garland, 2015; VanTassel-Baska, 2015; Wu, 2017)?

Early history. ***Differentiation.*** Robinson and Robinson (1982) theorized that educational settings should be matched to the gifted learner's abilities instead of their age. The theory questioned the effectiveness of the pullout gifted programs that have been utilized for decades. Then Ward (1982) questioned why the regular education classroom could not have the curriculum adapted to meet the needs of gifted students all day (Dai & Chen, 2013).

The theory of inclusion and differentiation for gifted students (Ward, 1982) was made even more important when Borland (2014) and Tomlinson (2004) provided research indicating students spend most of their time in general education classes whether they are gifted, average, or struggling.

Inclusion for students with disabilities. Several theories are based on the inclusive movement in education during the 1990s (Dai & Chen, 2013). Many including Stainback and Stainback (1990) addressed inclusion for special education students. Social constructionism was bringing light to the over-representation of children of color and low socioeconomic status in segregated classrooms (Anastasiou & Kauffman, 2011). The inclusion movement called for students with disabilities to be given a choice of an inclusive placement instead of being forced to be segregated into a different classroom from their peers (O'Neil, 1994).

There was opposition to inclusion by many including Jim Kauffman. (Anastasiou & Kauffman, 2011; Kauffman & Bader, 2014; Kauffman, Loyd, Baker, & Riedel, 1995; O'Neil, 1994). In an interview with John O'Neil (1994) Kauffman said, "We need different instruction for different kids, and you can't have all types of instruction happening in the same place at the same time" (p. 8). He believed the focus should be on instruction not inclusion (Kauffman & Bader, 2014; Kauffman et al., 1995; O'Neil, 1994).

The topic of inclusion became so substantial, that in 1997 a professional journal, "*The International Journal of Inclusive Education*" (Kauffman, Felder, Ahrbeck, Badar, & Schneiders, 2018, p. 2) was first published and is still published monthly today. Even as inclusion for children with disabilities was still being debated, theories on serving gifted students in the regular classroom began to surface (Dai & Chen, 2013; Sapon-Shevin, 1994).

Ideal inclusive school. In 1994, Sapon-Shevin questioned how education could "move toward integration in one area and toward segregation in another" (p. 64). She was referring to a scenario where a 7 year old child with severe cognitive and behavioral disabilities had been returned to her school and a classroom of her peers after her teachers were trained to adapt the curriculum to meet her needs; at the same time, an 8 year old child identified as gifted was pulled out once a week and sent to a different school to attend the gifted program (Sapon-Shevin, 1994).

Sapon-Shevin (1994) acknowledged that many who advocated for gifted education for years were worried that moving away from pull-out programs to inclusion would result in lower quality programming, the elimination of services, or not recognizing the different domains of giftedness. She addressed this fear by defining an inclusive school as one that is "responsive to individual needs" (Sapon-Shevin, 1994, p. 65). In an interview with O'Neil (1994) she explained regular classrooms would not look the same but would be restructured to create "a different kind of regular education classroom (p. 10). Sapon-Shevin (O'Neil, 1994) went on to say, "there would *probably* [emphasis added] be things like thematic instruction, cooperative learning, authentic assessment . . ." (p. 10).

Although Tomlinson (1994), believed inclusion was a great goal for public education, she felt the reality was it was a very long-range goal. She took Sapon-Shevin's (1994) scenario of a perfect inclusion classroom for a student with learning disabilities and replaced it with a perfect inclusion classroom for a gifted student. Tomlinson's (1994) ideal scenario included a trained and supported teacher in a school where no one resented or bullied gifted students. The regular classroom utilized all the strategies Renzulli (1977, 1978) and Gagné

(1985) had shown were most successful with gifted students in pull-out programs (Tomlinson, 1994). Tomlinson (1994) made it clear that this scenario was *ideal* not *real*.

Tomlinson (1994) explains that the reality is the pull-out programs for serving gifted students (as well as those for serving students with disabilities) are needed because those student's needs are not being met in the regular classroom. She believes that "conditions that make it difficult for classroom teachers to adapt instruction for varied learning needs continue to be pervasive after decades of reform efforts" (Tomlinson, 1994, p. 68).

To move toward the ideal classroom, Tomlinson and her colleagues report that a review of the literature indicates the difference begins with the teacher (Tomlinson, Brighton, Hertberg, Callahan, Moon, Brimijoin, Conover, & Reynolds, 2003). Teachers need to first see their diverse classrooms differently. "When teachers see differences as deficits in students, rather than as classroom characteristics, this may lead teachers to relinquish responsibility for the academic success of each learner (Paine, 1990)" (Tomlinson et al., 2003, p. 124). Tomlinson (1994) asserts research indicates teachers are more likely to differentiate for struggling students than gifted ones (Crammond & Martin, 1987; Tomlinson, 1994). While teachers talk about "ensuring equity and quality of educational opportunity for at-risk learners, there is virtually no parallel emphasis" (Tomlinson, 1994, p. 68) on providing quality instruction to grow advanced learners.

Teachers must also have training and support to be able to differentiate and serve their students if we want to move towards the ideal classroom (Tomlinson, 1994; Tomlinson et al., 2003). In 2013, Tomlinson responded to teachers' reasons for not being able to differentiate in their classrooms. In response to the common lack of time excuse, Tomlinson (2013) reminds teachers differentiation is not added on after everything is already planned.

"The goal is to plan instruction in a differentiated fashion from the onset" (Tomlinson, 2013, p. 40). She addresses teachers' fears of low-test scores if they differentiate by reminding them that the research indicates students typically show growth on high-stakes tests if their instruction is slightly more advanced than their level of mastery. If you do not individualize their instruction, their growth will stall (Tomlinson, 2004, 2013; Tomlinson et al., 2003).

Meeting all student's needs. Borland (2003) takes the idea of differentiation to a different level. He proposes that we should "have gifted education without gifted children" (Borland, 2003, p. 107). His theory is that if you are differentiating to meet the individual needs of each student in the regular classroom, there is not a need to label students. He argues that the concept of giftedness is a "social construct of questionable validity" (Borland, 2003, p. 106) and belief in giftedness has resulted in ineffective programming and "inequitable allocation of educational resources in this country" (Borland, 2003, p. 7). When discussing teaching with his students at Columbia University, Borland admits he must tell them, "this is the way things are done and the way you will probably have to do things" (Shaughnessy, Moore, & Borland, 2014, p. 249) while letting them know it is wrong.

As the differentiation paradigm continues to grow more theories are being developed. Matthews and Foster (2006) call for responsive education for students when the regular curriculum does not meet their needs. Dai (2010) posits that differentiation is needed when content is too challenging or not challenging enough. Coleman and Gallagher (1995) provided 12 basic guidelines in their attempt to defend differentiation. Callahan (1996) when listing the strengths and weaknesses of the field of gifted education called for research on differentiated curriculum for all students not just the gifted. Renzulli and Reis (1998) began looking at their talent development through differentiation in the regular classroom instead of pull-out.

RtI to MTSS. The national movement for response to intervention or instruction (RtI) has increased the need for research in the gifted education field for ways to meet the individual needs of gifted students in the regular classroom (Dai & Chen, 2013). The movement began when in 2004 federal legislation offered an alternative way to identify students with disabilities, but gifted education has begun looking at how the RtI framework might work to meet gifted students' needs (Coleman, 2014; Coleman & Hughes, 2009; Redenius & Skaar, 2017). Renamed Multi-Tiered Student Support (MTSS), the movement is heavily dependent on differentiation and Sailor, McCart, and Choi (2018) say it:

> (a) is non-categorical with respect to students -- it applies to all; (b) uses ongoing performance measures (e.g., screening, progress monitoring) to make decisions about interventions; (c) fully integrates social/behavioral interventions with academic interventions; (d) applies across all school settings rather than solely specific to categorical classrooms; (e) is a team-driven system that brings educators from categorical programs together with general educators in implementation; and (f) incorporates universal design for learning (UDL) principles which, in turn, facilitate desegregation of categorical programs such as special education (p. 15)

Although Sailor et al. (2018) claims the support is for all children, all of the literature on RtI and MTSS addresses how it will be used to identify and benefit struggling students.

Conclusions on the Differentiation Paradigm. The differentiation paradigm is young, and the gifted education field is still looking at the best way to serve gifted students in the 21st Century (Dai & Chen, 2013). The theories look at meeting the individual needs of gifted students in the regular classroom. The paradigm's theories of needs-based differentiation are believed to be a better way to serve advanced students than identification based on varied definitions and conceptions of giftedness, talent, aptitude, or potential. Identification is changing in the differentiation paradigm and if Borland's (2003) theory is believed might even become defunct in the future when there is individualized instruction for all and no need for labels.

In theories from the differentiation paradigm, students' individual educational needs in school subjects are met in the regular classroom no matter their level of need or advancement (Dai & Chen, 2013). Yet, as will be discussed later, *authentic differentiation* is rare and research indicates when teachers do differentiate their focus is on struggling students (Plucker & Callahan, 2014; Wu, 2017). Although differentiation is a viable strategy, differentiation in the regular classroom will need to have specific criteria met in order to be successful such as teachers training and support (Dai & Chen, 2013; Coleman & Gallagher, 1995; Tomlinson, 2013, 2017b). Learning-centered strategies need to be researched and tested to meet the needs of gifted students in the regular classroom (Dai & Chen, 2013, 2014; Tomlinson, 2017b).

Many of the theories in the differentiation paradigm are based on ideas from the field of special education. By addressing all students' individual needs, theories in the differentiation paradigm are attempting to address the inequalities in time spent on struggling students (Dai & Chen, 2013). Gallagher (1996) was a strong advocate for differentiation even though research indicated problems such as lack of efficacy in its implementation routinely resulted in its ineffectiveness. Gallagher (1996) still believed answers and solutions were and will continue to be found by research on differentiation and individualized instruction (Gallagher, 1996). This study will attempt to show a need for this research specifically to meet the needs of rural gifted students.

Conclusions on Historical Theories and Practice

The theories and paradigms I have covered are not inclusive but representative of most of the work in the field of gifted education up to the twenty-first century. Almost any former, current, or future practices, policies, or research fall under one of the three paradigms used to organize the theories. Although some theories might have pieces that would fall into more than one paradigm, according to Dai and Chen (2013), each of the paradigms maintain their own "identify and distinction in terms of core assumptions, goals, and principles" (p. 163). How a theory defines giftedness, who it identifies, how it serves students, and why it serves them are important to consider (Dai & Chen, 2013). The gifted child paradigm is well established and has been around the longest, but some of today's practices and policies still fall under its umbrella. The talent development paradigm remains a major belief system in gifted education and the differentiation paradigm is moving forward pushed by the RtI/MTSS movement. The three paradigms and their underlying major theories will serve to organize and increase my understanding as I look at gifted education policy and current literature in the field.

Historical Research and Policy

The theories from the talent development paradigm, including Renzulli's (1977, 1978), Sternberg's (1984), Gardner's (1983), Feldhusen's (1992), Gagné's (1985), and Gallagher's (2000) were the building blocks for gifted education policy in the United States.

They broadened educators' views of who is gifted and talented and began the process of considering the role of sociocultural context in identifying and serving gifted students (Brown & Garland, 2015; Jolly, 2014; VanTassel-Baska, 2018). These theorists made others begin to look at the circumstances surrounding individual students or groups of students and how those circumstances affect students' ability to learn and achievement. Looking beyond the IQ score for factors such as race, gender, language, location, and socioeconomic status began with the talent development paradigm theorists (Dai & Chen, 2013). The theories developed as Americans were calling for the government to do something about the Soviet Union launching into space before the United States. The launching of Sputnik even inspired the U. S. Congress, which had the educational commissioner Sidney Marland assess how the education system was serving gifted students and make recommendations for improvements (VanTassel-Baska, 2018).

The Marland Report

The resulting Marland Report (Marland, 1971) became a milestone in the field of gifted education even though the recommendations for professional development and research were basically overlooked. Without looking at how gifted students would be served, it made it hard for advocates to request resources to serve them (Gallagher, 2015). The report (Marland, 1971) did answer the who question by offering the first official definition of giftedness that included "general intellectual ability, specific academic aptitude, creative or productive thinking, leadership ability, visual and performing arts, and psychomotor ability" (Plucker and Callahan, 2014, p. 391). This definition became the standard for establishing state and local definitions of gifted students (Gallagher, 2015). Renzulli (1999, 2016a) explains defining and identifying gifted students should be for the purpose of providing special services to meet the needs based on why we identified them in the first place.

Marland (1971) reported that gifted programming did not serve a large percentage of students and minorities and economically disadvantaged students were extremely underserved. Also, programming specifically designed for the gifted was a low priority of the government with involvement by the federal government practically nonexistent. He also reported that “individual and social losses occur because the talents of the gifted are undiscovered and undeveloped” (Gallagher, 2015, p. 10).

Early State Level Policies

Although the federal government only acknowledged the definition of gifted from the Marland Report (1971) and did not choose to enact recommendations for federally funded professional development or programming, it prompted state level work that led to state policies on gifted education with both the federal government and all 50 states having some form of legislation on gifted education by the early 1990s (VanTassel-Baska, 2018). Policies across the country suggested schools offer advanced courses, accelerate coursework for early entry into college, and increase the amount of science, foreign language, and technology in the curriculum. California and Illinois were pioneer states and legislated *unmandated* policies in 1963 and 1965 respectively. Unfortunately, between 1970 and 2010 these frontrunners’ state governments decided, as the federal government before them, to remove the legislation so they would not have to fund these programs (VanTassel-Baska, 2018).

Beginning in 1970 other states began writing mandated policy that focused on program development instead of identification. With comprehensive programs organized in large cities and funding focused on professional development the goal was service for gifted students in all local school districts (VanTassel-Baska, 2018). Over the past 45 years, as policies came and went, what became clear was gifted education would be governed at the state level. This also means gifted education "is a state-based enterprise, subject to annual concerns about continued funding and even continued existence" (VanTassel-Baska, 2018, p. 99).

Gallagher's Influence

When Marland (1971) was preparing his report, James Gallagher was already a leading name in education (Jolly, 2014; Jolly & Robinson, 2014). He had already served as an associate commissioner for education in the United States Office of Education from 1967 to 1970. During that time, he served as the first chief of the Bureau for the Education of the Handicapped (BEH) and as the Deputy Assistant Secretary for Planning, Research, and Evaluation. His work was instrumental in developing and passing in 1975 what would become the Individuals with Disabilities Education Act (IDEA). Gallagher made sure the law included the creation of individualized education programs which are still required over 40 years later (Jolly & Robinson, 2014).

Gallagher, who resigned his job when he was ordered to speak against funding the recommendations in the Marland Report (1971), applied the knowledge of advocacy and policy he gained during this time to support the field of gifted education (Jolly & Robinson, 2014). He believed that policy is based on a society's values and therefore those values decide where resources including money and services are appropriated (Brown & Garland, 2015). Policy, according to Gallagher (1994) addresses four questions:

1. Who shall receive the resources?
2. Who shall deliver the resources?
3. What are the resources to be delivered?
4. What are the conditions under which the resources are delivered? (p. 337)

Gallagher (2015) argued for priorities to be set for gifted education. He cites the United States "economic, social, and political competition" (Gallagher, 2015, p. 78) with other countries around the world and the need for its brightest students to be able to perform at high levels to compete efficiently as reasons for planning and resources to be used for gifted education. He described politicians and educators alike nodding as he presented this argument but not actually initiating policies at any level to produce the suggested outcome (Gallagher, 2015).

Gallagher would continue to influence the field of gifted education including advocating for the gifted and helping states develop policy (Brown & Garland, 2015). Gallagher (2015) cited North Carolina as an exemplar where the legislature makes policy that is then translated by the State Department of Public Instruction into rules and mandates to be implemented in the school districts. Gallagher (2015) claimed the result of the mandated three-year Academically and/or Intellectually Gifted (AIG) local plans that must be approved by district level school boards and then reviewed by the North Carolina Department of Public Instruction (NCDPI) "has been that gifted students are planned for in every school district in the state" (p. 83). I agree the plans have been written, but a discussion on the equity and efficacy of those plans is needed and will be discussed later.

Current Research and Policy

The ideal scenario is that research would drive policies in gifted education. The policies should address the areas of identification, programs/services, professional development, and assessment and evaluation (Brown & Garland, 2015; Swanson & Lord, 2013; VanTassel-Baska, 2018). Unfortunately, due partly to a lack of basic legislation in federal and many state governments there has not been many changes in the field in the last 20 years. In identification for example, most states that have legislation leave the logistics of how students are identified up to the local school districts. Most of these policies are written based on the definition of giftedness in the legislation. These definitions are vague and vary based on which paradigm the authors used when writing the legislation (Swanson & Lord, 2013; VanTassel-Baska, 2018). Even though the IQ tests that have been the basis of identification for years proved to be based more on whether students circumstances remained the same (socioeconomic status for example) than an innate ability, they are still used as a measure in identification (Moore & Shenk, 2017).

In Gallagher's (2015) exemplar state of North Carolina, standards to guide mandated plans are given for identification, programming, curriculum and instruction, personnel and professional development, partnerships, and program accountability (NCDPI, 2018a), but how and if the plan meets those standards is left up to each individual district (NCDPI, 2018b). NCDPI can guide plan development by training, giving exemplars, reviewing, and making recommendations, but if the plan receives local school board approval it meets the letter of the law. NCDPI cannot withhold any state funding if the plan is submitted and has local school board approval (NCDPI, 2018b). Equity and efficacy of implementation in 115 diverse school districts becomes the question. That question becomes the subject and purpose of this study. For example, equity in identification is a long-standing debate in gifted education with several different views (Brown & Garland, 2015; Coleman & Shah-Coltrane, 2015; Gagné, 2011; Gallagher, 2002).

Is Gifted Education Equitable?

Gallagher and Kinney (1974) best describe the underrepresentation of socioeconomic disadvantaged or minority students as a "tragic waste of human potential: the concerto never written, the scientific discovery never made, the political solution never found" (p. vii). Gagné (2011) denies the underrepresentation in gifted education and says the statistics are skewed based on a "statistical amplification phenomenon (that) manifests itself when we compare percentages of selected individuals from two or more populations with different means" (p. 4). Most in the field acknowledge the inequity in the identification policies in the United States and are seeking solutions. Gallagher (2006) was instrumental in launching the Jacob K. Javits Gifted and Talented Students Education Program (Javits) which provided federal support emphasizing services for the traditionally underrepresented in gifted and talented programs (Coleman & Shah-Coltrane, 2015). Gallagher argues that the equity issue in education is creating an excellence issue in gifted education (Brown & Garland, 2015; Coleman & Shah-Coltrane, 2015; Gallagher, 2015).

Brown and Garland (2015) list few advancements and more problems due to the No Child Left Behind Act (NCLB) and what they call the "nations rhetoric toward equity as a failure of the country to value its human capital" (p. 92). Brown and Garland (2015) and VanTassel-Baska (2018) suggest that America's brightest students are being left behind due to the NCLB and its replacement Every Student Succeeds Act (ESSA) (United States Department of Education, 2002; USDE, 2018). The consensus is more time is spent on struggling students, especially ones on the borderline of passing high stakes tests. These tests are required by the federal government if a state, district, or school is to receive federal funding, and are then required by state legislation and policy to meet the ESSA requirements (USDE, 2018). The lack of mandates or funding for gifted education at the federal level is more evidence to these researchers, as it was to Gallagher, that we are creating an *excellence gap* (an academic difference between groups of advanced students) while trying to *close the gap* (the movement to close the academic differences for all students, especially students disadvantaged due to race, socioeconomic status, or language barriers) (Brown & Garland, 2015; Hardesty, McWilliams, & Plucker, 2014; VanTassel-Baska, 2018). When most gifted students could pass the state test for a grade level when they begin the school year, it is easy for teachers to choose to spend most of their time working with struggling students (VanTassel-Baska, 2018). With Szymanski, Croft, and Goder (2018) reporting 63% of teachers give the most attention to struggling students and 73% of teachers agreeing that their brightest students are often bored and under-challenged, it is no wonder that our brightest students are not internationally competitive (Azano et al., 2017; Brown & Garland, 2015; Szymanski et al, 2018; VanTassel-Baska, 2015, 2018; Wu, 2017).

Identification

The current state of the field is filled with conflicting theories of how the problem of the excellence gap should be attacked (Hardesty et al, 2014; Hernandez-Torrano, 2018). The first conflict is in the identification of gifted students themselves. Most policies leave the identification up to the individual school districts (Swanson & Lord, 2013; VanTassel-Baska, 2018). Although most agree that a multiple measure approach should be taken, there is disagreement upon what these measures should be and what the cutoff for meeting the measure should be. The conflicting views of IQ being a true measure of intelligence and stable throughout a lifetime versus intelligence being malleable and environmentally affected leads to other conflicts (Moore & Shenk, 2017). If intelligence is not stable and a district uses an IQ score from 3rd grade as one of the main measures or even as the only way into the pool of students being considered, a student whose ability level increases due to some life changing influence might never be identified or challenged up to their potential. There are also conflicting views on the minimum percentile to be identified gifted. If the minimum is to perform in the 90th percentile and a student performs in the 89th percentile does the student not still need more challenging work than one who performs in the 50th percentile? Should the percentiles themselves be nationally or locally normed (Azano et al., 2017; Moore & Shenk, 2017; Plucker & Callahan, 2014; Plucker, Hardesty, & Burroughs, 2013; Swanson & Lord, 2013; VanTassel-Baska, 2015, 2018)? The use of non-verbal tests to try to level the field racially, culturally, and based on socioeconomic status is a debate into itself with Azano et al. (2017) citing concerns the potential being measured does not match underlying abilities and non-verbal tests are not valid in measuring verbal abilities.

Prior research in identification was performed on the assumption that using more than just an IQ test for ability (although as described above what other measures such as achievement tests, grades, or rating scales should be used to ensure equitable identification is still a mystery (Cao, Jung, & Lee, 2017)) would solve the problems of under identifying minority students and students from low-income families, but a study done in the last 5 years indicates that the simple use of multiple measures (in this case ability and achievement tests plus a teacher rating scale) does not help identify more of these marginalized students (Swanson & Lord, 2013). "Simply using more measures is not as important as how those measures are actually used" (Plucker & Callahan, 2014, p. 395).

Borland (2014) acknowledged the limited effective research on identification but expresses promise for the future of identification research. I believe the most promising is the argument presented by Peters, Matthews, McBee, and McCoach (2014). Plucker and Callahan (2014) summarized this argument well. From the beginning identification has been used to keep students out. "Instead … identification should be used as a means of inclusion (locating more students) as opposed to exclusion" (Plucker & Callahan, 2014, p. 396). This study will seek to show inequality in identification practices among school districts and hopefully show the need for more research in how to include underrepresented populations including students in rural school districts. If a district succeeds in identifying more students and a more diverse population of students, the next piece of the puzzle is programming.

Programming

Swanson and Lord (2013) claim South Carolina's pull-out program works well for *all* their gifted students. Other researchers seem to disagree and assert one type program cannot meet the needs of the diverse number of gifted students (Azano et al., 2017; VanTassel-Baska, 2015, 2018). Wu (2017) tells educators they must stop studying characteristics and study interventions. He (Wu, 2017) claims unbiased research is the only way to solve the dilemma. A significant amount of research has already been done in three areas of programming: differentiation, acceleration, and curriculum design.

Differentiation. The first is differentiation within the classroom. Gallagher (2002) suggests that although it has potential to be an effective intervention, unfortunately when teachers do differentiate their focus is on struggling students. Plucker and Callahan (2014), Tomlinson (2013), and Wu (2017) agree many teachers do not have the time or training to do *authentic differentiation* (effective differentiation that responds to and meets the needs of *all* students in the classroom (Tomlinson, 2017a)). Authentic does *not* mean letting gifted students have free time, help others, or read while the teacher does interventions with struggling students (Plucker & Callahan, 2014; Tomlinson, 2013, 2014; Wu, 2017). It is responsive, quality instruction that is student centered and uses multiple approaches in a blend of whole-class, group, and individual settings (Tomlinson, 2017a).

To try to overcome the time constraints on teachers with increasing class sizes Tomlinson (2013) and Wu (2017) discuss the use of a *prescriptive curriculum* (comes with predeveloped units) for differentiation. Wu (2017) recommends the CLEAR curriculum, which is prescriptive and combines Tomlinson, Kaplan, and Renzulli models, as a solution to the work of developing interventions and differentiation units. Research on professional development on differentiation shows that only 25% of teachers continue to differentiate after the training with another 50% understanding how to differentiate but only willing to continue it in their classroom if it is a prescriptive curriculum like CLEAR (Wu, 2017). The question of fidelity comes up with any differentiation when considering authenticity and implementing programs as they were intended (Plucker & Callahan, 2014; VanTassel-Baska, 2018). Using predeveloped curriculum for differentiation brings up the cost factor which will be discussed later.

Acceleration. Another promising programming option is acceleration. According to Siegle, Wilson, and Little (2013), the dilemma with acceleration is educators' unfounded beliefs and perceptions most of which are based on myths and lack of knowledge. Educators, parents, and other stakeholders often associate acceleration only with grade skipping and not with one of at least 19 approaches (Colangelo et al., 2004; Siegle et al., 2013). The approaches usually fall under one of the following two umbrellas: content- or *subject-based acceleration* or *grade-based acceleration*.

Subject-based acceleration. Subject-based acceleration involves a student being accelerated in one discipline such as math or reading. There are many subject-based acceleration models including curriculum compacting, allowing students to go into a class with older students for one subject, providing an advanced class for a group of advanced students, dual enrollment, advanced placement courses, use of distance learning or other technology or differentiation and interventions within the regular classroom on that subject. Students are usually with their own age-peers for all other subjects (Plucker & Callahan, 2014; VanTassel-Baska, 2018).

The most commonly used form of subject-based acceleration is Advanced Placement (AP) at the high school level (Plucker & Callahan, 2014). In 2013 (NAGC & CSDPG, 2013) 29 states had at least a piece of a policy mentioning acceleration with over half mandating the use of AP. Plucker and Callahan (2014) claim their popularity is more from convenience than effectiveness, and describe the conveniences including taking AP courses usually not affecting a student's grade-level and AP courses are taught by high school teachers. However, the research on these programs has provided mixed results and tends to indicate that all students, and especially gifted students, would get more academic growth if allowed to skip grades and take college courses from college professors (Plucker & Callahan, 2014).

Grade-based acceleration. Grade-based acceleration usually involves students moving totally out of classes with same-aged peers. Examples are grade skipping, multi-age classrooms, early entrance to kindergarten or college, early graduation, or early college (Plucker & Callahan, 2014; VanTassel-Baska, 2018).

According to Siegle et al. (2013), one of the myths of grade-based acceleration is the effect on the social and emotional health of students. *Meta-analysis* (a statistic combining the results of multiple scientific studies) and more traditional research have shown largely positive conclusions about the effective use of almost all forms of acceleration. Assouline, Marron, and Colangelo (2014) note an average effect of nearly a year's additional academic growth for grade-based or subject-based accelerated students in their meta-analysis. More importantly the research contains evidence of social and emotional benefits for most forms of acceleration including grade based (Assouline et al., 2014; Colengelo et al., 2004).

In 2011, Steenbergen-Hue and Moon explained that the social and emotional benefits can be less pronounced than the academic. Whether analyzed separately or used as a moderating variable in meta-analysis, VanTassel-Baska (2018) found the research indicated all types of acceleration produce notable academic gains and small-to-moderate social-emotional gains for gifted students.

Curriculum design. The last area with extensive research to support policy decisions is curriculum design. Plucker and Callahan (2014) divide the many available models of curriculum design into either a descriptive framework that gives the teacher a guide in developing daily lessons or a prescriptive framework where the teacher is given a unit that was already developed based on the model. Although descriptive models may provide examples, they do not provide predeveloped units and the research indicates “limited evidence of effectiveness” (Plucker & Callahan, 2014, p. 395). Most descriptive curriculum models fall into the category of differentiation which research indicates has not been effective with gifted students although it has potential (Plucker & Callahan, 2014; Wu, 2017). According to Wu (2017), the potential lies in prescriptive models. Plucker and Callahan (2014) would agree and their review of the research shows teachers given a prescriptive curriculum are more likely to produce growth for gifted students.

Conclusions on programming. Providing opportunities to advanced students is vital. Plucker and Callahan (2014) claim, “(U)nless advanced learners have their talents fostered and remain challenged in K-12 schools, they will never develop their full potential” (p. 392). Brown and Garland (2015) agree, “Gallagher’s message is that society loses human capital if gifted children are not nurtured” (p. 91). Nurturing in this context is what Renzulli (2016b) describes as providing some type of programming to meet students’ needs whether it is one of the three covered here or another type of programming. This study will attempt to determine if there is an equitable number of programming opportunities between rural and urban school districts. If there are, the study will further try to determine what factors including funding might be related to the inequity.

Defining Rural Gifted Education

The definition of rural gifted education depends on the definition of *rural*. The problem is the many different definitions provided by policies, organizations, government agencies, and researchers. Kettler, Puryear, and Mullet (2016) reviewed 17 published research articles to see how they defined rural. They found the definitions were inconsistent which created a problem for generalization beyond the school or district where the research took place. Some of the definitions were based on locale or size of school which can have major variations. Some even defined rural qualitatively and claimed it is a subjective concept. “People may not be able to define rural, but they know it when they see it” (Kettler et al., 2016, p. 247).

Although school size is arguably a factor in providing gifted education, Kettler et al. (2016) suggest very large districts and schools can still face the same problems in gifted education if they are not located close enough to leverage resources from urban areas. Resources unavailable to rural students could include universities, museums, and business partners (Kettler et al., 2016). Kettler et al. (2016) suggest researchers should not use the word *rural* without first discussing the meaning of the word. For this reason, a detailed description of how districts and schools will be labeled rural or urban is included in the methodology section of this study.

Problems in Rural Gifted Education

Problems arise when educators try to provide education to advanced students in rural districts and schools. Research shows that rural school districts allocate proportionally less money and teachers to gifted education than suburban and urban schools (Kettler, Russell, &

Puryear, 2015). "Students in rural settings are less likely to be identified as gifted and generally have fewer opportunities for gifted education services" (Kettler et al., 2015, p. 101). Not all the problems are unique to rural settings, but they are compounded by factors found in rural districts and schools. Funding, a low number of identified students, and stakeholders' beliefs and attitudes affect identification and programming in rural districts and are the contributing factors to the *opportunity gap* between gifted students in urban and rural school districts.

Funding. Funding is an issue in gifted education. The federal government provided funds through the Javits Act of 1990. The largest allocation was in 2016 for twelve million. In the same fiscal year, almost thirteen billion was budgeted for special education programs (U. S. Department of Education, 2016). Javits provided grants for research and programs but has not been funded in several years. Programs funded by Javits have mostly discontinued at the local levels without money for professional development and resources (VanTassel-Baska, 2018). The states emphasize special education and struggling students in their budgets to ensure they meet the requirements to receive federal money including the dollars for special education, Title I funds (for schools with high free and reduced lunch), and others, none of which include gifted education. Even in the states that allocate funds for gifted students, the legislation has no requirements on how the money is spent (Azano et al., 2017; Plucker & Callahan, 2014; Swanson & Lord, 2013; VanTassel-Baska, 2018). This causes a larger funding issue in rural gifted education.

When the money is divided to the districts proportionally by a percentage of their Average Daily Membership (ADM), rural districts tend to spend less money per pupil on gifted education. Without state policies requiring curriculum, decisions on how the money is spent is left up to each district. Rural districts may allocate a smaller portion for their gifted education operating budget and faculty (Kettler et al., 2015; VanTassel-Baska, 2018).

Services and programming are directly affected by each district's decisions. When the state's budget includes cuts to staff and programming, the gifted education teachers and programs are the first to go in rural school districts. When the number of identified students is low, it is easy to take a position that was dedicated to only gifted students and turn it into a regular classroom teaching position serving a few gifted students. Research shows the teacher in the new position will devote most of the instructional time to the struggling students since most gifted students will be able to pass state tests before they ever enter the classroom (Azano et al., 2017; Kettler et al., 2015; Plucker & Callahan, 2014; Szymanski et al., 2018; VanTassel-Baska, 2018; Wu, 2017). Kettler et al. (2015) found the cost of gifted education may just be greater for rural schools.

In North Carolina inequality in local funding is an issue for all students. In 2018, the North Carolina Public School Forum released an article discussing the findings from researching the latest county data available. They (Public School Forum of North Carolina, 2018) found in 2015-2016, the ten highest-spending counties spent four times more per child than the ten lowest-spending counties or an average of $3,103 per student versus $739 per student. With 60 of North Carolina's 100 counties below the state average for local support per pupil, they found raising taxes was not a solution. Even though the ten poorest counties raised their taxes at almost double the rate of the ten wealthiest, they could not generate near as much revenue due to lower property values (Public School Forum of North Carolina, 2018). Public School Forum President and Executive Director Keith Poston said:

> Our poorest counties continue to fall further behind our wealthier counties in terms of resources available to their local schools. Young people born into one of the state's economically thriving counties, typically the more urban centers, have levels of investment in their education not shared elsewhere in the state, especially our rural counties. (Public School Forum of North Carolina, 2018, paragraph 3)

With fewer local monies to meet the educational needs of students, as Kettler et al. (2015) and VanTassel-Baska (2015) explained above poorer rural districts may choose to spend funds provided for gifted students to meet the needs of all students in the district. This might mean funds from the AIG budget might go to pay for a teacher with only one gifted student in her classroom and no effective programming to meet the student's needs. As Azano et al. (2017), Kettler et al. (2015), and Plucker and Callahan (2014) all agree, it is most likely that teachers focus will be on struggling students.

Low number of identified students. The low numbers of identified gifted students in rural schools can be a problem even if there is funding. Since money is spent on staff that are not dedicated to only gifted students, rural schools might not be able to offer as many programs or services. The fewer students identified in a school or grade level, the harder this becomes (Kettler et al., 2015).

According to Wu (2017), many rural school districts choose to offer differentiation in the regular classroom to try to meet the needs of their gifted students. The research shows that differentiation is usually focused on struggling students (Azano et al., 2017; Kettler et al., 2015; Plucker & Callahan, 2013) and is only successful if it is a prescriptive curriculum (Wu, 2017). Many teachers trying to meet the diverse needs in a rural classroom use scripted units which are usually low-level curriculum (Wu, 2017). The prescriptive curriculum units that research indicates teachers will use to differentiate to fidelity come with a high price tag that most rural school districts cannot afford (Kettler et al., 2015; Wu, 2017).

In some rural classrooms, a teacher may have only one or two students identified. Chances are these students are already at or beyond the standard for the end of the grade. It is easy to see why a teacher who is held accountable more by the number of students who pass state mandated testing at the end of the year than how much each student grows, focuses more on getting as many students as possible at the standard. The result is bored and unchallenged gifted students (Azano et al., 2017; Szymanski et al., 2018; VanTassel-Baska, 2018; Wu, 2017).

Although as discussed above, acceleration is a research proven solution, there are mistaken beliefs that prevent many rural districts from taking advantage. The beliefs and attitudes of stakeholders both researched-based and opinion-based cause several problems in rural gifted education.

Stakeholders’ beliefs and attitudes. Many stakeholders including educators and community members associate acceleration only with grade-based and believe it causes students social and emotional problems. According to Colangelo et al. (2004), the research says the opposite. Acceleration including grade-based increases gifted students’ academic growth and has even shown to slightly increase the social and emotional growth. The only type of acceleration that has not shown academic growth in recent studies is AP and IB courses. Since a student’s grade level is unaffected and scheduling is easy with these courses, most rural school districts try to provide as many AP courses as possible to show they are meeting gifted students needs in high school (Colangelo et al., 2004; Plucker & Callahan, 2014).

Another area where beliefs and attitudes are causing problems in gifted rural education is the pull-out programming option. According to Wu (2017), for decades, rural school districts have used this option to serve the low number of students identified in one school with a teacher who travels from one school to another. Usually the students only see the teacher once or twice a week for an hour or less. This program is mistakenly believed to meet the educational needs of advanced students. Wu (2017) found that when the students are in their regular classrooms the same standards are taught in the same way, at the same pace as all other students. Classroom teachers justify spending more time with struggling students because the needs of the gifted students are met by someone else. They believe their responsibility is to teach the standards of that grade level, so the student will pass the state mandated tests at the end of the year. The result is gifted students remain bored and unchallenged except for an hour or two a week (Wu, 2017).

Wu (2017) suggests the belief that students are only gifted for the time they are pulled out is now accepted by many parents and worse by many teachers and principals. Principals are only willing to try other service options if they lose the position of the pull-out teacher. When pull-out programs are lost, parents believe their child is no longer identified or receiving any services (Wu, 2017). Although Swanson and Lord's (2013) research in South Carolina claims the state's pull-out program is meeting the needs of their students, the question of whether the data is skewed to the urban areas where more students are identified versus the rural schools' low number of contributions to the data is not addressed. Also, the data in the research did not address growth, only the achievement on the state tests, which research has shown many gifted students could pass on the first day of class (Azano et al., 2017; VanTassel-Baska, 2018; Wu, 2017).

Teachers' and principals' beliefs and attitudes are also a problem in identifying and serving gifted students in rural districts. Szymanski et al. (2018) suggested that although negative underlying beliefs mostly go unexamined by the educator, they influence interactions with gifted students. They can affect nominating students for identification and providing differentiated curriculum and challenging rigorous experiences for advanced students (Szymanski et al., 2018).

Plucker and Callahan (2014) indicate that with a lack of funding for professional development, examining these beliefs and improving attitudes is almost impossible. Many times, students from rural areas who might be from lower socioeconomic backgrounds or belong to racial, ethnic, cultural, and linguistic minority groups are not nominated for identification by educators because their academic achievement is low (VanTassel-Baska, 2018). Some educators have a negative attitude towards advanced students and prioritize their time with students needing to meet the standards on the mandated state tests (Plucker & Callahan, 2014; VanTassel-Baska, 2018).

Community stakeholders' beliefs can influence funding, identification, and programming. When asked for local funding, rural communities do not want to fund programs that will enable the most advanced students in the district to go to college and not return to the community (Azano et al., 2017). Azano et al. (2017) indicates parents of underrepresented students, lower socioeconomic status or linguistic minorities for examples, will not usually nominate their children for identification, nor will the students self-nominate. They will also not argue or demand services. This results in a lower probability of these students being identified or if identified a lower probability of their needs being met (Azano et al., 2017; Kettler et al., 2016). Kettler et al. (2015) believes, "there may be complex cultural preferences associated with rural schooling that impact local decisions" (p. 114).

With NCLB came the call for closing the gap. Over time advocates and researchers have realized the detrimental effect of NCLB on gifted education (USDE, 2002). With the emphasis on getting struggling students to grow, continuing to grow gifted students was often forgotten. Closing the gap became improving struggling students' academic performance and stalling the growth of advanced students (Azano et al., 2017; Brown & Garland, 2015; Hernández-Torrano, 2018; Plucker & Callahan, 2014; VanTassel-Baska, 2015, 2018). Plucker and Callahan's (2014) call for "raising the achievement levels of underachieving groups, not by allowing already high-performing groups to slip" (p. 400) reveals that gifted students may even be going backwards.

Plucker, Hardesty, and Burroughs (2013) suggested that in rural districts the excellence gap can be compounded by lower socioeconomic students not being identified or served. They (Plucker, Hardesty, & Burroughs, 2013) showed that in high school or higher education, poor gifted students did not achieve at the same level as other gifted students. Lack of state policy to identify these students was an issue but some progress has been made *except in rural areas* (VanTassel-Baska, 2018). Hernández-Torrano (2018) discussed the difference in rural average students scoring very similar to urban average students on academic assessments versus students identified gifted in rural areas scoring lower than those in the gifted subgroups of urban areas.

Conclusions on problems in rural gifted education. In rural districts, funding, a low number of identified students, and stakeholder's beliefs and attitudes are problems that collaboratively create more issues and become contributing factors to an *opportunity gap* (differences in opportunities such as identification and services offered). The opportunity gap between gifted students in urban and rural schools is possibly the largest contributor to the *excellence gap* (differences in academic performance between two groups of gifted students) between the gifted in urban and rural settings. This study will attempt to show an opportunity gap exists between rural and urban gifted students in North Carolina and find if it is related to differences in academic performance for the two groups. How differences in funding might relate to the opportunity and excellence gaps between the two groups will also be explored.

Opportunity Gap

There are advantages and disadvantages to attending a school in a rural district (Wu, 2017). Many researchers agree the biggest disadvantage is a lack of opportunity when compared to a suburban or urban district (Azano et al., 2017; Kettler et al., 2016, 2015; Wu, 2017). Commonly there is an experiential opportunity gap between urban and rural districts. Rural students do not have as many opportunities to travel, go to museums or historical sites, or access to larger libraries of books and information. Rural students may not have the same access to a university campus or even a community college to take dual enrollment courses or attend enrichment opportunities (Azano et al., 2017; Wu, 2017).

Gifted rural students may not have access to as many programming opportunities as their urban counterparts. Differences in funding or funding resources between rural and urban districts and the lack of identification of many rural lower socioeconomic or minority students can both affect programming opportunities (Azano et al., 2017; Kettler et al., 2015). Wu (2017) alluded to the cost of research-based programs proven to meet the needs of gifted students being a challenge in many rural districts. Kettler et al. (2015) found economically disadvantaged schools, particularly ones in rural settings, had fewer opportunities to take algebra in the 8th grade and generally less opportunities for advanced curriculum than schools in upper-middle-class settings. Kettler and his colleagues (Kettler et al., 2016, 2015) agree that rural gifted students tend to have less opportunities than their counterparts because, with fewer resources, rural students are less likely to be identified and have access to advanced programs.

Identification and lack of funding to offer more programming opportunities both need to be addressed to begin the development of strategies to close the opportunity gap between rural and urban gifted students.

Conclusions: Chapter 2

Problems with fair and equitable access to gifted education services exist in most school districts. Kettler et al. (2015) suggests they exist before and after identification. The two major factors in creating an opportunity gap for rural gifted students appear to be a low number of identified students and factors, including low funding, that limit programming opportunities (Kettler et al., 2015). Could identifying more students give incentive to increase or reallocate funds to create more programming opportunities? How can we identify more students?

Research on identification has resulted in the use of multiple measures instead of just the IQ tests of the past. Unfortunately, the use of multiple measures did not increase the identification of underrepresented students as hoped, especially in rural school districts (Azano et al., 2017; Plucker & Callahan, 2014; VanTassel-Baska, 2018). Swanson and Lord (2013) saw a rare opportunity to research how effective changes in identification and services for gifted at the state level would be when South Carolina responded to an Office of Civil Rights (OCR) investigation for unequitable identification and services in their gifted programs. They (Swanson & Lord, 2013) reported the state looked at the individual measures to try to solve the problem. The state eliminated teachers as the gatekeepers of nominations and used an inclusive screener in 2nd grade instead. Also, a student's parents could nominate, or they could nominate themselves. They then added performance-based assessments and lowered the required scores on ability and achievement tests for identification. The results were an increase in identification of underrepresented groups, but not in all schools or districts. Most of South Carolina's *rural* districts and schools did not experience the increase (Swanson & Lord, 2013).

One researched solution was the use of non-verbal testing. Nov-verbal testing was intended to eliminate the bias in testing. The research indicates non-verbal tests have a lack of validity in predicting verbal achievement and cannot differentiate between bias and actual differences in academic readiness due to *differences in educational opportunity* (Azano et al., 2017; Plucker & Callahan, 2014). Azano et al. (2017) suggests these differences in educational opportunities exist between rural and urban students. They (Azano et al., 2017) decided to attempt to address the differences and the resulting lower scores of gifted rural students on achievement tests by creating the CLEAR curriculum model.

When developing the CLEAR curriculum model, Azano et al. (2017) locally normed the Cognitive Abilities Test (CogAT) -verbal which was given to all 2nd graders in the participating schools. The idea that students in a rural setting might be gifted but have not been given the opportunity and access to acquire aptitude and academic knowledge at the same rate as students in urban settings is a newer concept. Azano et al. (2017) cites the effectiveness of using local norms to identify more students from underrepresented populations in rural areas in the Madison Metropolitan School District (2013).

If the tests used for identification in rural districts were locally normed, students would be identified based on how well they compare to peers who had the same opportunities. Azano et al. (2017) found locally norming the CogAT increased the number of students in the nomination pool during their research. This type of identification might also increase the probability of minority and socioeconomically disadvantaged students receiving services (Azano, et al., 2017).

Plucker and Callahan (2014) call for more empirical research in gifted education and state a need for replication to help dispel myths in the field. More research is needed to see if the number of rural students identified increases if all testing for identification is locally normed, but prior research indicates it would (Azano, et al., 2017).

If rural schools had a larger percentage of identified gifted students, they would need to provide programs and services to meet the diverse needs (Plucker & Callahan, 2014; Swanson & Lord, 2013). Funding would be the first issue that arose. New studies in meeting all students' individual needs, including gifted students, are being conducted using the Responsiveness to Intervention (RTI) models or Multitiered Systems of Support (MTSS) (Plucker & Callahan, 2014; Redenius & Skaar, 2017). As teachers use this model to meet struggling student's needs, they could provide and share interventions to meet the needs of the advanced students in their classrooms as well. With creative scheduling that would not require funding, schools could utilize teamwork and volunteers to allow gifted students to accelerate or go deeper into the standards while struggling students could get the help they need.

Plucker and Callahan (2014) call for more research into these interventions and using the RtI framework to meet gifted students' individual needs. Redenius and Skaar (2017) in their research with pre-service teachers found potential for benefits for RtI/MTSS programs for gifted students but also call for more research in the area. In North Carolina, where MTSS is being mandated in all school districts, it is important to make sure gifted students are not left reading or with free time while struggling students get the help they need. With all the mandated changes in the Exceptional Children's (EC) identification process, an opportunity to include gifted students' identification in the MTSS program might present itself. RtI was designed to meet all children's needs, not just struggling students' needs (Redenius & Skarr. 2017).

Azano, et al. (2017) and Hernandez-Torrano (2018) discuss opportunity gaps exist where there are inequalities among districts in identification, programming, and resources. Kettler, Puryear, and Mullet (2016) call for more research on differences in opportunities among rural and urban districts. This study will look for the inequalities among urban and rural districts in identification, programming, and resources and their relationships to opportunity gaps and possible differences in learning outcomes.

Inclusive identification and better funding to provide programming to meet the needs of a greater number and more diverse identified gifted population in rural school districts is needed. In North Carolina, I believe a good beginning would be to compare the identification, services, and funding for school districts looking for differences in the opportunity to be identified, programming opportunities, and funding for rural and urban school districts and to discover if they have an effect on each other or academic outcomes such as ACT scores and NC EOGs and EOCs. I theorize research that attempts to discover if these differences or opportunity gaps exist between rural versus urban districts and their influence on learning outcomes for gifted students is needed. Discovery of any inequities for students attending rural versus urban school districts and the effects of these inequities on learning outcomes might inspire a call for better identification and relocation of or increase in funding to more equitably meet gifted students' needs.

As the "man in the White hat" (Jolly & Robinson, 2014, p. 445) or James Gallagher would say:

> There are many students with high native abilities that remain uncrystallized because of a lack of opportunity, practice, and motivation. It is the responsibility of families, schools, and society to create a more favorable atmosphere for the full development of all students – including those with outstanding talents. (Gallagher, 1995, p. 408)

Chapter 3: Methodology

Although there has been research in the last several decades on learning opportunities for gifted students, there has been limited research on the equality of access to these opportunities. The research that does exist mostly focuses on less opportunities for minority students due to unequitable identification plans (Azano et al., 2017; Coangelo, et al., 2004; Coleman & Shah-Coltrane., 2015). Whether minority students identified as gifted have equal access to learning opportunities provided for all gifted students is not addressed. The research on gifted education is very sparse when looking at the disadvantages for rural students not only in identification but considering if the learning opportunities offered after identification are the same as those offered to identified students in urban school districts.

Previous research from the literature suggests an opportunity gap exists between the gifted students attending rural schools and the gifted students attending urban schools (Azano et al., 2017; Brown & Garland, 2015; Hardesty et al., 2014; Hernández-Torrano, 2018; Kettler et al., 2016). There is little to no research on how capacity and context of districts might relate to differences in the identification and service opportunities nor how the learning outcomes of gifted students might be affected.

Trajkovski (2016) recommends a “systematic step-by-step approach” (p. 7) as the best way to decide how to address a research problem. This chapter begins by specifying the overall research questions and then the null and alternative hypotheses that were tested to find answers. The sample population and method of sampling is described including the coding of districts as urban or rural. The research methods including the type of study are explained. Then the variables and statistics that were used for testing each hypothesis are detailed (Trajkovski, 2016). The chapter ends with a discussion of possible threats to validity and the attempt to limit their impact and hope the study at least plants some seeds for change in gifted education in rural school districts.

Research Questions

How do the differences in public school districts' contexts and capacities affect the development of their gifted students?

(1) What are the effects of context of public school districts on the design and implementation of gifted programming?

(2) What are the effects of differences in design and implementation of gifted programming on gifted student outcomes?

(3) What are the effects of public school district capacity and resulting allocation of resources on gifted student outcomes?

Hypotheses

Hypothesis One

Hypothesis One (H1): There is a statistically significant difference among urban and rural school districts with respect to the percent of gifted students identified.

Null Hypothesis One (HO1): There is no statistically significant difference among urban and rural school districts with respect to the percent of gifted students identified.

Hypothesis Two

Hypothesis Two (H2): There is a statistically significant difference among urban and rural school districts in the percent of opportunities for gifted students.

Null Hypothesis Two (HO2): There is no statistically significant difference among urban and rural school districts in the percent of opportunities for gifted students.

Hypothesis Three

Hypothesis Three (H3): There is a statistically significant difference among urban and rural school districts in financial resources.

Null Hypothesis Three (HO3): There is no statistically significant difference among urban and rural school districts in financial resources.

Hypothesis Four

Hypothesis Four (H4): There is a statistically significant relationship between the amount of financial resources and the percent of students identified AIG.

Null Hypothesis Four (HO4): There is no statistically significant relationship between the amount of financial resources and the percent of students identified AIG.

Hypothesis Five

Hypothesis Five (H5): There is a statistically significant relationship between the amount of financial resources and the percent of opportunities offered in each district.

Null Hypothesis Five (HO5): There is no statistically significant relationship between the amount of financial resources and the percent of opportunities offered in each district.

Hypothesis Six

Hypothesis Six (H6): There is a statistically significant difference in learning outcomes among urban and rural districts.

Null Hypothesis Six (HO6): There is no statistically significant difference in learning outcomes among urban and rural districts.

Hypothesis Seven

Hypothesis Seven (H7): There is a statistically significant relationship between the percentage of advanced opportunities and the learning outcomes for the gifted student subgroup.

Null Hypothesis Seven (HO7): There is no statistically significant relationship between the percentage of advanced opportunities and the learning outcomes for the gifted student subgroup.

Hypothesis Eight

Hypothesis Eight (H8): There is a statistically significant relationship between the amount of financial resources and the learning outcomes for the gifted student subgroup.

Null Hypothesis Eight (HO8): There is no statistically significant relationship between the amount of financial resources and the learning outcomes for the gifted student subgroup.

Hypothesis Nine

Hypothesis Nine (H9): There is a statistically significant difference in cutoff scores for ability and achievement tests among urban and rural school districts.

Null Hypothesis Nine (HO9): There is no statistically significant difference in cutoff scores for ability and achievement tests among urban and rural school districts.

Hypothesis Ten

Hypothesis Ten (H10): There is a statistically significant relationship between the cutoff scores for ability and achievement tests and the percent of students identified gifted.

Null Hypothesis Ten (HO10): There is no statistically significant relationship between the cutoff scores for ability and achievement tests and the percent of students identified gifted.

Selection and Coding of Districts

Population

According to Adams and Lawrence (2018), a student researcher must narrow their population due to lack of sufficient resources and time. Therefore, I limited my population to the 115 public school districts in North Carolina. I first identified the districts as rural or urban.

Kettler, Puryear, and Mullet's (2016) research suggests one must first frame the research by explaining the definitions and method used to decide what makes a school or district either rural or urban. I decided the most accurate labeling system was designed by the NCES (2019). They revised their locale classification system in 2006 into an "urban-centric" system from the previous "metro-centric" system. The "urban-centric" classification system is based more on the proximity to an urbanized area than population or county boundaries. Therefore, one school in a district could be suburban while another in the same district could be rural. There are four major locale categories of city, suburban, town, and rural in their classification system, each with three subdivisions. For the purposes of this research any school that fell into the six locale identifiers under urban or suburban were entered as urban schools. Schools that fell within the six locale identifiers under town and rural were entered as rural (NCES, 2019).

It should be noted that by the Office of Management and Budget (OMB) definitions of metro areas upon which the new classification system is based, 80 of North Carolina's 100 counties are considered rural and North Carolina has the second largest rural population in the United States after Texas (Tippett, 2016). Yet, in the 2012-2013 school year, NCES (2019) reported approximately 70 percent of all public-school students attended urban or suburban schools leaving only 30 percent attending town or rural schools.

Sampling

I began by using the standard sample size formula to compute how many of the 115 school districts I would include in the study. I wanted a 5% confidence interval and to be 95% sure (a 95% confidence level) that my results fell into the resulting interval (Adams & Lawrence, 2018).

I did my calculations as follows:

ss = (.25 $(1.96)^2$/.05) (with 1.96 being the z score for a 95% confidence level and .05 the decimal representation of a 5% confidence level)

ss = 19.208

New ss = ss/[1+(ss-1)/n] (with n being the number of high schools in my sample)

New ss = 16.5825 = 17

(Adams & Lawrence, 2018)

I wanted to reduce sampling bias and only 17 districts to represent the entire state seemed too small a sample. Patten (2017) says one of the two major ways to reduce sampling errors is to use stratified random sampling. Further, "stratification will improve precision only if the stratification is based on a variable that is relevant to the issue being studied" (Patten, 2017, p. 59). Whether a district is rural or urban is very relevant to the learning outcomes of the gifted students in this study. I decided to see how many of the 115 districts were rural and how many were urban by the definition of this study. I divided the districts into two strata: rural and urban.

To form the two groups of urban and rural districts for analysis, every school in all 115 districts' locale code was looked up in the NCES (2019) list and recorded as a "1" for urban if the code was 11, 12, 13, 21, 22, or 23 and into a "2" for rural if the code was 31, 32, 33, 41, 42, or 43. Of the 115 districts, 72 contained schools that were all coded rural therefore the districts were coded "2". Another six districts contained schools all coded urban and those districts were coded "1". If a district had both urban and rural schools, it was coded a "3". Since more than ten were coded a "3", I looked at the districts and further defined a rural and urban district to include more districts in the data and reduce bias sampling (Adams & Lawrence, 2018).

Nineteen districts were less than 70% either urban or rural and were removed from the study due to the inability to clearly distinguish their status. The remaining 18 districts were analyzed to see if the schools in the larger percentage represented over 80% of the district's average daily membership (ADM). Three mostly rural and three mostly urban districts did not represent at least 80% of their ADM and were removed from the study. Twelve districts ranging from 80% to 94% rural or urban did represent at least 80% of their ADM. Five were coded rural or "2" and seven were coded urban or "1". This left 90 districts in the study with 13 in the urban group and 77 in the rural group.

Adams and Lawrence (2018) assert that the best way to reduce bias in sampling is to test all the members of a population if the size of the population is not too large. I decided the number of districts that were defined as rural or urban was a manageable number, therefore, I included them all in the sample and used the two levels as my independent variable. The resulting sample of 90 districts were used as the independent variable to answer the research questions (Patten, 2017). They form the variable *district code* with urban districts coded "1" and rural districts coded "2".

The North Carolina Department of Commerce reported the North Carolina Rural centers classification of counties in 2015. Pennington's (2015) article puts 80% of the counties rural and 6% urban with 14% somewhere in between. Of the 115 public school districts, about 21% were not distinguishably either rural or urban, 67% were designated rural, and 12% were designated urban. Considering some counties have more than one school district and the definition for coding districts is more complicated, the 86% rural districts and 14% urban districts used in this study closely reflect his findings.

Note that the number of districts (n) used in tests do not always add up to the total (N) of 90. This is due to accountability rules in the state of North Carolina which states that any group with less than 10 individuals cannot be reported and any group with less than 5% can only be reported as having less than 5% (NCDPI Division of Accountability Services, 2019). In some instances, a district might not have data due to the accountability rule. The accountability rule was written to meet the terms of the Family Educational Rights and Privacy Act (FERPA). FERPA is also the reason Socially and Economically Disadvantaged (SED) data was not available for the AIG subgroups (NCDPI Division of Accountability Services, 2019; US Department of Education, 2019)

Research Methods

Since the independent variable in the study has two levels that cannot be manipulated or changed, I used a non-experimental research design (Price et al., 2017). I also used an explanatory correlational research approach for the study. Creswell (2012) explains that explanatory correlational research looks for significant relationships between two or more variables. The research provides the direction and strength of those relationships. A positive relationship indicates that changes in one variable reflect changes in the same direction in the other variable. A negative relationship indicates that changes in one variable reflect changes in the opposite direction in the other variable. A correlation coefficient, *pho*, indicates the strength of the relationship between the two variables (Creswell, 2012). I used correlational research instead of causal research because it was not possible to totally rule out all factors that affect learning outcomes in this study. Therefore, I could not say one variable caused another since there could be other factors involved (Adams & Lawrence, 2018; Creswell, 2012; Patten, 2017; Price et al., 2017).

I tried to determine if there is a difference in the number of students identified AIG, number of challenging opportunities offered, financial resources, and learning outcomes of the AIG subgroup among urban and rural districts. I also looked for correlational relationships between financial resources and number of students identified, opportunities offered, and AIG subgroup learning outcomes. Significant relationships between opportunities offered and AIG subgroup learning outcomes were explored along with any other relationships that could affect identification, opportunities offered, or learning outcomes. Although correlational research cannot claim a causal effect, it can determine if a relationship exists and if not "rule out" a variable as a cause (Adams & Lawrence, 2018).

Discovering Contexts and Capacities of the Districts

Factors in Identification

The study began with an analysis of the identification section of each district's North Carolina's AIG plan (NCSBE, 2018) to obtain a list of different identification practices. A comparative descriptive design was used to look at the differences in the rural and urban districts' practices (Adams & Lawrence, 2018; Loeb, Dynarski, McFarland, Morris, Reardon, & Reber, 2017). To organize data, I created a spreadsheet with the districts listed in rows and the first column containing the *district code* variable. The remaining columns contained common identification factors found in the literature such as ability tests, achievement tests, grades, and portfolios (Callahan & Hertberg-Davis, 2013; Plucker & Callahan, 2013, 2014; Naglieri & Ford, 2015; Valler, Burko, Pfeiffer, & Branagan, 2017). When an unlisted factor was encountered, I added another column. If a district uses the practice to identify gifted students a "1" was entered. I analyzed the results looking for any factors related to the capacity or context of districts that might have a significant difference among rural and urban districts.

What Opportunities are Offered for Gifted Students

Next, an analysis of the Comprehensive Programming within a Total School Community and the Differentiated Curriculum and Instruction standards of each district's AIG Plans (NCSBE, 2018) was completed. Using prior research to frame the study, I added columns to the spreadsheet of districts listing common opportunities for gifted students found in the literature (Callahan & Hertberg-Davis, 2013; Plucker & Callahan, 2013). If a district provides the "opportunity" a "1" was placed in the column. If opportunities mentioned in a document were not in the spreadsheet, a column was added. When data could not be found I called the district and asked the relevant questions to obtain the most valid data possible (Adams & Lawrence, 2018).

A total number of possible opportunities was computed, and each district received a percentage computed by taking the number of opportunities offered in that district and dividing by the total number of types of opportunities offered at all districts. After analysis, I provided a description of the data including the formation of variables for statistical analysis.

Methods for Testing Hypotheses

Hypothesis One

I obtained data for each district including the number of identified students and ADM from year of data. I added columns and filled in the amounts for the number of identified Asian, Black, Hispanic, White, female, and male subgroups. Columns were added for the ADM of Asian, Black, Hispanic, White, female, and male students. The percentage of population identified was calculated using the formula: (number identified) divided by (total ADM), for each district and each subgroup in each district.

Districts Code was the independent variable on a nominal scale and each percent of identified students (total and each subgroup) was the dependent variable on a ratio scale. I first checked for normal distribution using SPSS software to decide which test to use to find a significant difference among urban or rural districts for percent of students identified. The hypothesis is non-directional, therefore I compared the normally distributed variable groups using the *two-way independent samples t-test* which tests for significant differences in the means of two groups (Aldrich & Cunningham, 2016). I then performed the non-parametric *Mann-Whitney U test* which is the alternative to the independent t-test that first changes all data to ordinal data and compares the mean ranks of the two groups on the abnormally distributed variables (Aldrich & Cunningham, 2016). I then analyzed the results to see if there is a significant difference in the percentage of students identified among urban and rural districts including each subgroup (Loeb et al., 2017; Patten, 2017; Price et al., 2017).

Hypothesis Two

First the percentage of opportunities offered at each district found in the analysis above became the dependent variable(s) on a ratio scale and was tested for normal distribution. Then using *district code* as the nominal independent variable, since all distributions were abnormal, the Mann Whitney U test was used to determine if there is a significantly significant difference in the mean rank percentage of opportunities in rural schools to the mean rank percentage of opportunities in urban schools (Adams & Lawrence, 2018; Patten, 2017).

Hypothesis Three

To test H03, first financial data was found for each district including specific money provided and spent on AIG. *District code* was the independent variable on a nominal scale and financial resource variables were the dependent variables on an ordinal scale. I first checked all financial resource variables for normal distribution using SPSS software to decide which test to use to decide if there are significant differences among urban or rural districts for the financial resource variables. Since all distributions were abnormal, the Mann Whitney U test was performed for the two-group comparison. The results were analyzed to see if there is a statistically significant difference in the total amount of financial resources among urban and rural districts (Loeb et al., 2017; Patten, 2017; Price et al., 2017).

Hypothesis Four

For H04, variables included the financial resources variables per district on an ordinal scale and percent of students identified variables on a ratio scale. Since the analysis did not involve comparing the means of two groups but seeing if there is a relationship or correlation between the two variables, a different test was needed. Since all variables were found to have abnormal distributions the non-parametric test *Spearman's correlation coefficient* test was used. Spearman's correlation coefficient test compares two variables and gives a correlation coefficient (ρ) indicating the strength of the relationship between the two variables, whether it is a positive or negative relationship, and the significance (p) of the relationship (Aldrich & Cunningham, 2016). I analyzed the results looking for significant relationships between the financial variables and each identification subgroup (Adams & Lawrence, 2018; Patten, 2017).

Hypothesis Five

I followed the same steps used to test H04 with the financial resource variables being tested against the opportunity variables to try to find any significant relationships.

Hypothesis Six

First data was collected for any learning outcomes specific to the AIG subgroup including but not limited to ACT composite and subtests and NC EOGs and EOCs. Next, each of the collected learning outcome variables were tested to see if they had a normal distribution. Then with the *district code* variable of urban or rural again serving as the nominal independent variable and the learning outcome variables as the dependent variables on an ordinal scale, if they were normal distributions, a two-way independent t-test (the hypothesis is non-directional) was run and for abnormal distributions, a Mann Whitney U test was performed to determine if attending a urban or rural school district has a statistically significant impact on the learning outcomes of AIG students (Adams & Lawrence, 2018; Patten, 2017).

Hypotheses Seven and Eight

To test H07 and H08, I used the same steps as H04 with different variable sets. For H07 the variables were the opportunity variables and the learning outcome variables. For H08 the variables were the financial resource variables and the learning outcome variables.

Hypothesis Nine

Null hypothesis H09 was derived from the analysis of the identification process. It states there is no statistically significant difference between the cutoff scores for ability and achievement testing among urban and rural districts. The variables for the minimum score on an ability test and the minimum score on an achievement test were formed from the data. Each were tested for normal distribution. With *district codes* serving as the independent variable the Mann Whitney U test was used to discover any significant differences among urban and rural districts mean ranks (Aldrich & Cunningham, 2016).

Hypothesis Ten

Also derived from the analysis of the identification process, H010 states there is no statistically significant relationship between cutoff scores for ability and achievement testing and the percent of students identified. The cutoff score variables for the minimum score on an ability test and the minimum score on an achievement test were used along with the identification variables found in testing H01. The same steps used to test H04 were used to test for a statistically significant relationship between cutoff scores and the percent of students identified including in each subgroup.

Measurements

Although the data I am using is archival since the ACT is used as a learning outcome, I believe a quick discussion of reliability is necessary. The criterion-related reliability or the ability to show mastery of certain criterion is accepted by most, but the tests are used to "predict" how well a student will do in college (Robinson, 2017). With the ACT composite having a reliability score of .96 to .97 (ACT, 1997) the criterion reliability is hard to question, but many are questioning the ability of the test to predict college success. As far as prediction validity, the ACTs composite is more reliable as a predictor than its subtests. For the purposes of this study I feel the criterion-related reliability is sufficient to increase validity.

The state tests used for learning outcomes require some explanation. One measure used is the district's growth of the AIG subgroup. Academic growth is a measure of the progress a student makes from one testing cycle to the next testing cycle. Growth is measured by the Education Value-Added Assessment System (EVAAS) by SAS (2014).

The other measures from state tests used include End of Grade (EOG) tests and End of Course (EOC) tests. The business rules for calculating a districts measure are available online (NCDPI, 2018c). Since the study involves the AIG subgroup, I chose the percent of AIG students scoring a 5, which is the highest score possible. Using both the nationally normed ACT and the state normed EOGs and EOCs allows for a more valid picture of the learning outcomes for each district.

Validity

Besides the measure reliability, another internal threat to validity in the non-experimental study would be history. We cannot ensure that all students identified as gifted were exposed to all the opportunities or were even in that school district when some of the opportunities were offered. The use of the districts' average scores on ACT and the percent making 5s on EOGs and EOCs covering grade spans from 3-12 in the data will help to decrease this threat as much as possible. Also, since I am not trying to prove cause, just relationships, this data should be sufficient (Patten, 2017).

Since the study is non-experimental, most of the validity threats are external. I decreased selection bias by using all districts in the sample. To reduce other external threats for non-experimental I did not attempt to generalize any findings outside of my population and I will never misrepresent the study as finding cause (Patten, 2017).

Significance

The literature I reviewed indicated an opportunity gap between gifted students in rural and urban school districts. The literature also suggests an excellence gap between these two groups of advanced students. Finding the differences in opportunities for these students in North Carolina and the possibility of an impact on the students' futures might begin to shine a light on the problem. Having statistical data is essential in getting all levels of educators in North Carolina to even consider change. This work needed to be done to stimulate an interest in forming feasible plans to close the opportunity gap and the excellence gap between groups of gifted students in our state.

Chapter 4: Results

The purpose of this study was to discover any differences in identification and programming for AIG students due to contexts and capacities of public-school districts. The study sought to find any relationships between differences in contexts and capacities and identification, programming, and learning outcomes for AIG students. Although there is research on the impact of different contexts and capacities among urban and rural school districts and on problems equitably serving gifted students, there is a dearth of investigation into how the context and capacities of urban and rural districts might affect opportunities including identification for AIG students and relate to learning outcomes. This study attempts to answer the following research questions:

(1) What are the effects of context of public school districts on the design and implementation of gifted programming?

(2) What are the effects of differences in design and implementation of gifted programming on gifted student outcomes?

(3) What are the effects of public school district capacity and resulting allocation of resources on gifted student outcomes?

The study set out to address the following initial null hypotheses:

H01: There is no statistically significant difference among urban and rural school districts with respect to the percent of gifted students identified.

H02: There is no statistically significant difference among urban and rural school districts in the percent of opportunities for gifted students.

H03: There is no statistically significant difference among urban and rural school districts in financial resources.

H04: There is no statistically significant relationship between the amount of financial resources and the percent of students identified AIG.

H05: There is no statistically significant relationship between the amount of financial resources and the percent of opportunities offered in each district.

H06: There is no statistically significant difference in learning outcomes among urban and rural districts.

H07: There is no statistically significant relationship between the percentage of advanced opportunities and the learning outcomes for the gifted student subgroup.

H08: There is no statistically significant relationship between the amount of financial resources and the learning outcomes for the gifted student subgroup.

During the research the following additional null hypotheses directly related to the questions emerged:

H09: There is no statistically significant difference in cutoff scores for ability and achievement tests among urban and rural school districts.

H010: There is no statistically significant relationship between cutoff scores for ability and achievement tests and the percent of students identified gifted.

This chapter begins with the results of testing each hypothesis one through eight broken down into data collection, distributions, results, and conclusions. A discussion of discovering similarities and differences in the identification process of districts follows with data collection and results including the means of all identification variables. Finally results from the two null hypotheses derived from the identification process analysis are provided.

Difference in Percent of Students Identified Among Urban and Rural Districts

Data Collection

Null Hypothesis One states there is no statistically significant difference among urban and rural school districts with respect to the percent of gifted students identified. To test this hypothesis, the total ADM of each district along with the ADM of the subgroups Asian, Black, Hispanic, Multi-race (Multi), White, female, and male were collected (NCDPI, 2019a). A subgroup for economically disadvantaged is not available for AIG in North Carolina. Next, the number of students identified AIG from each district were entered along with the number of identified students in each of the subgroups (NCDPI, 2019b). Calculations were then performed to find the percentage of total ADM identified, and the percentage of ADM for each of the following subgroups: Asian, Black, Hispanic, White, female, and male. An excel spreadsheet with the variables district code, total ADM identified, and percentages of each subgroup students' ADM was prepared for SPSS. When discussing a subgroup variable, it is important to understand it is the percent of students from that subgroups ADM identified. For example, the variable *Asian* is the percent of Asian students in a district identified as AIG. This data collection resulted in one main variable, total percent identified, and seven sub variables: Asian, Black, Hispanic, multi, White, female, and male.

Distributions

A *p-plot*, a graph of all points with an approximation of a linear line drawn (Aldrich & Cunningham, 2016), was created for each of the dependent variables. The p-plots all appear close to normal distribution, but to ensure the best outcomes, using SPSS, a *Kolmogorov-Smirnov* test which determines if the distribution of data would approximately fit a normal curve was performed on each variable (Aldrich & Cunningham, 2016). The null hypothesis of a normal distribution was rejected on all except the subgroups of Asian and female. Therefore, non-parametric analysis was used for total percent identified variable, and the other five subgroup percentage variables (Aldrich & Cunningham, 2016).

Results

The Mann-Whitney U test is used to determine if there is a significant difference in data when the variables do not have a normal distribution (Aldrich & Cunningham, 2016). The test was conducted using SPSS with the district code as the independent variable and each of the identification variables without normal distributions as the dependent variables. The most important result is the rejection of the null hypothesis of no significant difference for the total percent identified (see Table 1). The p value of .021 is less than the .05 level set and indicates a significant difference in the total percent identified AIG among urban and rural districts. Table 1 provides the following: p which is the significant value; n which is the number in each group; mean ranks; and mean rank differences for each of the variables that rejected the null hypothesis of no significant difference. Notice the mean rank is greater for urban districts in all cases with the urban districts mean rank 18.12 percentage points higher than the rural district's mean rank in total percent identified AIG. Figure 5 compares the medians of the two groups for percentage of total percent identified. It is notable that all the urban districts' points fall above the overall median of 10.01% and the median of the rural districts' points is slightly less than the overall median.

Next, the two-way independent t-test used for comparing the means of two groups when variables have a normal distribution was conducted using SPSS for the dependent subgroup variables Asian and female across the independent variable of district codes for

Table 1

Significant Differences in Identification Among Urban and Rural Districts

	p		n	Mean Rank	Mean Rank Difference
Total percent identified	0.021	URBAN	13	61	18.12
		RURAL	77	42.88	
Multi	0.016	URBAN	13	42.23	13.58
		RURAL	49	28.65	
White	0.001	URBAN	13	64.85	24.51
		RURAL	74	40.34	
Male	0.012	URBAN	13	62.38	19.73
		RURAL	77	42.65	

Note. n is number of districts with data points.

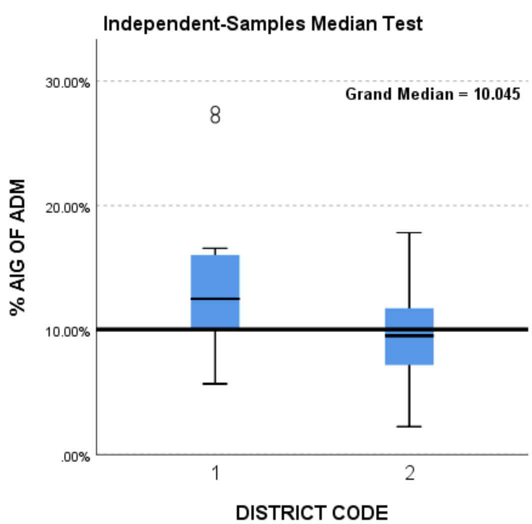

Figure 5. The histogram of the difference in the medians of the total percent identified AIG with “1” representing the urban districts and “2” representing the rural districts.

urban and rural districts (Aldrich & Cunningham, 2016). Although the percent of Asian students identified has a mean difference of 3.22 falling between the 95% confidence interval of -2.26 to 8.7, the p value of .242 is too high a probability the results are by chance so we cannot reject the null hypothesis. The percent of female students identified has a mean difference of 4.244 which falls between the 95% confidence interval of .036 to 8.45 and with a *p* value of .048 we can be over 95% sure in the result and reject the null hypothesis. Therefore, there is a significant difference in the percent of female students identified AIG with the urban mean 14.14% and the rural mean 9.9%.

The results indicated there was not a difference among urban and rural districts in the percent of Black and Hispanic students based on ADMs. Since research indicated these were still underrepresented groups in gifted identification, further analysis was conducted. The means of percent identified for all subgroups was found for all districts (Table 2). The data indicates the percent of Whites identified is three times the percent of Blacks identified and almost three times the percent of Hispanics identified. The Asian subgroup has the highest percent of their ADM identified.

Conclusion

Null Hypothesis One states there is no statistically significant difference among urban and rural school districts with respect to the percent of gifted students identified. The results indicate the null hypothesis should be rejected and there is a significant difference between the percent of gifted students identified with urban districts having a larger percent of their ADM identified than rural districts. This is also true for the percent identified in subgroups: Multi-race, White, female, and male. No significant difference was found for the subgroups: Asian, Black, or Hispanic.

Table 2

A Comparison of Means of Percent of ADMs Identified from All Districts

	Minimum	Maximum	Mean	Std. Deviation
% ASIAN AIG OF ASIAN ADM	2.94%	34.04%	20.27%	8.02%
% BLACK AIG OF BLACK ADM	1.39%	10.95%	4.36%	2.03%
% HISP AIG OF HISP ADM	1.64%	17.08%	6.12%	3.03%
% MULTI AIG OF MULTI ADM	2.91%	30.85%	10.16%	5.40%
% WHITE AIG OF WHITE ADM	5.69%	36.96%	15.26%	6.30%
% FEMALE AIG OF FEMALE ADM	1.88%	28.15%	10.51%	4.44%
% MALE AIG OF MALE ADM	0.82%	27.21%	9.78%	4.25%

When the means of all identification variables were compared, it was found that the percent of White students identified is three times that of Black students and almost three times that of Hispanic students. The Asian student subgroup has the highest percent identified out of all subgroups.

Difference in Opportunities for Gifted among Urban and Rural Districts

Data Collection

Null Hypothesis Two states there is no significant difference among urban and rural school districts in the percent of opportunities for gifted students. To collect the data on opportunities offered in districts, all 90 of the AIG plans (NCDPI, 2019c) were reviewed. On first reading, all opportunities mentioned by authors in literature review (Advanced Placement courses for example) were highlighted on first reading along with any other opportunities and a running list was maintained. The plans were reread with closer scrutiny to see if any opportunities found in later plans were mentioned but missed on first reading. Opportunities offered at all districts (e.g., North Carolina Virtual Public-School courses) were eliminated from the list. Outliers that were only offered at one district were considered in an attempt to place them in another category on the list.

NCDPI's data system called EDDIE (NCDPI, 2019d) was used to fill in for categories derived from plans but the plans did not have enough information. Finally, the information on community colleges and universities was obtained (NC Community Colleges, 2019; The University of North Carolina, 2019; NCPedia, 2019) and combined with the categories and codes from the analysis of the plans and EDDIE. Table 3 shows which of these opportunities were considered and how the values were assigned to districts to find percentage of opportunities for each.

Last, although all plans mentioned Advanced Placement (AP) courses, only a few told what was offered in the district. Each district's website (or if necessary, each individual high schools' website) was analyzed to determine how many of the 38 AP Board (2019) courses are offered in each district in at least one of their high schools. Three variables were

Table 3

Opportunities and Credit Used in Study

	Amount out of Total Opportunities						
OPPORTUNITY	0	1	2	3	4	5	6
Specific K-3 Nurturing Program	None	YES					
Elementary Grouping		Inclusion/Pullout	Ability				
High School Courses Offered in Middle School	None	NC Math I Only	More than NC Math I				
Stem or Magnet Programs Offered in Regular Schools	None	One grade span or type	More than one grade spans or type				
District Technology 1:1	None	9-12 only	6-12	K-12			
International Baccalaureate	None	Yes					
Early College	None	One	Two	More than two			
Magnet Schools	None	One	Two	Three covering only one grade span	Three covering more than one grade span	More than three covering only one grade span	More than three covering more than one grade span
Community College in District	None	Yes					
Number of Public or Private Universities or Colleges in District	None	1	2	3	4		

calculated: percent of AP courses out of 38 (percent of AP); percent of other opportunity points out of the total possible of 25 (percent of other opp); and percent of total opportunities combining AP and other out of total of 63 (percent of all opp).

Distributions

The p-plots all seem to show normal distributions, but the Kolmogorov-Smirnov Test for normal distribution indicates the null hypothesis should be rejected for all three variables so the variables are assumed to not have normal distributions and non-parametric tests will be used on all opportunity data statistics.

Results

The Mann-Whitney U was run using SPSS with district codes serving as the independent variable and each of the three opportunity variables as dependent variables. The results for all three variables indicated HO2 must be rejected since the *p* value was less than .001. The data were reviewed to see why the probability was so high that there was a significant difference and when the data was sorted by high to low percentages most of the urban districts had high percentages and most of the rural district had low percentages with just a few overlapping in the middle. A look at the difference in the rank means demonstrates the percent of opportunities as described in this study are much larger in the urban districts than the rural districts. Table 4 shows the significant value *p,* the mean ranks for urban and rural districts and the difference in mean ranks.

Conclusions

Null Hypothesis Two states there is no significant difference among urban and rural school districts in the percent of opportunities for gifted students. The results of the Mann-Whitney U test show the null hypothesis should be rejected and there is a significant

Table 4

Significant Differences in Opportunities Among Urban and Rural Districts

	p		Mean Ranks	Difference
Percent of AP	0.001	Urban	55.77	24.2
		Rural	31.57	
Percent of Other Opp.	0.001	Urban	57.54	26.37
		Rural	31.17	
Percent of all Opp.	0.001	Urban	58.12	27.08
		Rural	31.04	

difference in the percent of opportunities discussed in this study for gifted students with most urban districts having a much higher percentage of opportunities.

Differences in Financial Resources Among Urban and Rural Districts

Data Collection

Null Hypothesis Three states there is no significant difference among urban and rural school districts in financial resources. The NCDPI statistical profile application was used to collect funding data to test this hypothesis in as many ways as possible (NCDPI, 2019f). A spreadsheet was built for SPSS containing the total budget for each district, the amount of each districts state allotment, the amount of money each district reported spent on AIG, local funds for AIG, and grants and other funds for AIG. The total money allotted to AIG was calculated by adding the state allotment, local funds for AIG, and grants and other for AIG.

This provided four financial based variables: total district budget, state allotted AIG funds, local allotted AIG funds, and total allotted AIG funds.

Distribution

None of the p-plots for the data indicated normal distribution, but the Kolmogorov-Smirnov to determine normal distribution was conducted on all four variables to make sure. All indicated to reject the null hypothesis and assume they were not normal distributions; therefore, non-parametric tests will be used with all financial resource variables' statistic evaluations (Aldrich & Cunningham, 2016).

Results

The Mann-Whitney U was conducted using SPSS for all four monetary dependent variables using district code as the independent variable (see Table 5). Table 5 shows the significant value *p*, the mean ranks and the difference in mean ranks for the four variables. All four financial resource variables showed a significant difference among urban and rural districts. The state allotted AIG funds were expected since the amount is based on 4% of ADM and most of the urban districts have higher ADMs than the rural districts, but the variable will be important when looking at significant relationships later in the study. Local funds for AIG indicated a significant difference with a *p* value of .001 and urban districts having a mean value 30 percentage points higher than rural districts. Total allotted AIG funds also had a *p* value less than .05 of .001 indicating a significant difference between the allotted funds with urban districts again having the larger mean rank with a difference of 27.2 points.

Table 5

Significant Differences in Financial Resources Among Urban and Rural Districts

	p		Mean Ranks	Difference in Mean Ranks
Total District Budget	.013	Urban	62.23	19.55
		Rural	42.68	
State Allotted AIG Funds	.001	Urban	68.85	27.29
		Rural	41.56	
Local Allotted AIG Funds	.001	Urban	71.85	30.8
		Rural	41.05	
Total Allotted AIG Funds	.001	Urban	68.77	27.2
		Rural	41.57	

Note. These are mean ranks not the means in dollars since the variables did not have normal distributions.

Conclusions

Null Hypothesis Three states there is no significant difference among urban and rural school districts in financial resources. The null hypothesis is rejected for all four financial resource variables and there is a significant difference among urban and rural school districts in financial resources. Urban districts have more financial resources in all cases with mean rank differences ranging from 27.2 to 30.8 points.

Relationships Between Financial Resources and Percent of Students Identified

Data Collection

Null Hypothesis Four States there is no statistically significant relationship between the amount of financial resources and the percent of students identified AIG. The data needed for this hypothesis has already been used and the required variables were pulled into a spreadsheet. For the financial resource variables, the four used for testing HO3 were pulled. For identification, all eight of the variables used to test HO1 were added to the spreadsheet. This provided 32 pairs of variables to test for significant relationships.

Distributions

The p-plots have been considered and the Kolmogorov-Smirnov test for normal distribution has already been conducted on all variables. Since none of the financial resource variables are normal, non-parametric tests will be used for all 32 pairs of variables (Aldrich & Cunningham, 2016).

Results

The non-parametric Spearman's Correlation Coefficient, which is the test for finding any significant relationships between two variables and the strength of the relationship when at least one does not have a normal distribution (Aldrich & Cunningham, 2016) was performed on the 32 pairs of data. According to Dancy and Reidy's (2014) interpretation chart of Spearman's Correlation Coefficient (rho, ρ) any coefficient +/- 0.1 to +/-0.3 has a weak relationship, a coefficient +/- 0.4 to +/-0.6 has a moderate relationship, and a coefficient +/- 0.7 to +/- 0.9 has a strong relationship. A coefficient of 0 has no relationship with +/- 1 having a perfect relationship. Table 6 shows the correlation coefficient (ρ), significance (*p*), and the number of districts that had reported data points (n).

Every financial resource variable had a significant relationship with the total identified AIG in a district and the three subgroups of White, female, and male. The results of the test reveal three significant moderate positive relationships. Local funds and the percent of male students identified have a correlation coefficient (ρ) of .408 with a significant value (*p*) of .001. Total allotted AIG funds and percent of White students identified have ρ =

Table 6

Significant Relationships Between Financial Resources and Identification

		Total Percent Identified	Asian	Black	Hispanic	Multi	White	Female	Male
Total District Budget	ρ	.311*	0.234	0.12	-0.028	0.121	.372*	.337*	.359*
	p	0.003	0.13	0.337	0.816	0.348	0.001	0.001	0.001
	n	90	43	66	72	62	87	90	90
State Allotted AIG Funds	ρ	.330*	0.117	0.092	-0.035	0.1	.386*	.352*	.380*
	p	0.002	0.454	0.463	0.77	0.438	0.001	0.001	0.001
	n	90	43	66	72	62	87	90	90
Local Allotted AIG Funds	ρ	.379*	.355*	0.15	0.032	.252*	.354*	.359*	**.408***
	p	0.001	0.019	0.229	0.786	0.048	0.001	0.001	0.001
	n	90	43	66	72	62	87	90	90
Total Allotted AIG Funds	ρ	.361*	0.205	0.077	-0.039	0.147	**.413***	.384*	**.411***
	p	0.001	0.188	0.54	0.746	0.255	0.001	0.001	0.001
	n	90	43	66	72	62	87	90	90

Note. Significant moderate or strong correlations are in boldface.
*Correlation is significant at the 0.05 level.

.413 and $p = .001$. Total allotted AIG funds and percent of male students identified have $\rho = .411$ and $p = .001$.

Conclusions

Null hypothesis four states there is no statistically significant relationship between the amount of financial resources and the percent of students identified AIG. The null hypothesis is rejected and there is a statistically significant relationship between all four financial resource variables and the total percent identified AIG in each district.

Relationships Between Financial Resources and Opportunities

Data Collection and Distributions

Null Hypothesis Five states there is no statistically significant relationship between the amount of financial resources and the percent of opportunities offered in each district. The data needed to test this hypothesis was already collected. The opportunity data collected to test HO2 and the financial resource data collected to test HO3 were all pulled into a spreadsheet containing the variables: total district budget, state allotted AIG funds, local allotted AIG funds, total allotted AIG funds, percent of AP, percent of other opp., and percent of all opp. The variables were already tested for previous hypotheses and found to not have normal distributions, so non-parametric statistical tests will be used.

Results

To test this hypothesis, pairs of variables were tested for any significant correlations between them. Each of the four financial resource variables were tested with each of the three opportunity variables for a total of 12 tests. Since the variables do not have normal distributions, Pearson's correlation test could not be applied and instead the non-parametric Spearman's Correlation Coefficient was conducted (Aldrich & Cunningham, 2016). The results are in Table 7 which includes the correlation coefficient ρ, significant value p, and n for the number of districts with data values. There are no moderate or strong correlations. Significant relationships exist between the total district budget, the state allotted AIG funds, and the total allotted AIG funds and both the percent of AP and the percent of all opp. Only the total district budget has a significant relationship with percent of other opp. Local allotted AIG funds did not have any significant relationships with opportunity variables.

Table 7

Significant Relationships Between Financial Resources and Opportunities

		Percent of AP Classes Offered	Percent of other opportunities	Percent of all Opportunities
Total District Budget	ρ	.356*	.240*	.395*
	p	0.001	0.023	0.001
	n	90	90	90
State Allotted AIG Funds	ρ	.335*	0.185	.366*
	p	0.001	0.081	0.001
	n	90	90	90
Local Allotted AIG Funds	ρ	0.001	0.062	0.048
	p	0.993	0.564	0.652
	n	90	90	90
Total Allotted AIG Funds	ρ	.335*	0.201	.368*
	p	0.001	0.058	0.001
	n	90	90	90

* Correlation is significant at the 0.5 level

Conclusions

Null hypothesis five states there is no statistically significant relationship between the amount of financial resources and the percent of opportunities offered in each district. The results show significant relationships between all the financial resource variables except local allotted AIG funds and the percent of all opportunities offered in a district. All but local allotted AIG funds also show significant relationships with the percent of AP courses offered in a district. The most significant relationship is almost moderately positive between a district's total budget and the overall opportunities offered with $\rho = .395$ and $p = .001$.

Differences in Learning Outcomes Among Urban and Rural Districts

Data Collection

Null Hypothesis Six states there is no statistically significant difference in learning outcomes among urban and rural districts. The major learning outcome variable was formed using each district's average growth index for the AIG subgroup. Next, each district's AIG subgroup's percent at level 5 for the entire district, 3-8 grade span, reading 3-8 grade span, math 3-8 grade span, science 3-8 grade span, 9-12 grade span, math 9-12 grade span, biology 9-12 grade span, and English II grade 9-12 grade span were used to form nine more variables.

The last set of variables were formed using the ACT test results. First a variable was created using each district's AIG subgroup's percent meeting the ACT composite of 17. Next five variable sets were created using each district's AIG subgroup's percent meeting the ACT's English, math, reading, science, and writing benchmarks. Two more were formed with the AIG subgroup's all subtests benchmark (sum of subtests) and meeting the four-subtest benchmark (no writing). A total of 18 learning outcome variables were collected for testing (NCDPI, 2019g).

Distributions

First p-plots were graphed using SPSS for each of the 18 learning outcome variables. All p-plots appeared to indicate normal distributions, but the Kolmogorov-Smirnov test for normal distribution was conducted using SPSS. All variables are normally distributed except for science percent level 5 in 3-8 grade span, percent AIG subgroup meeting ACT composite of 17, percent meeting the ACT English subtest benchmark, and percent meeting the ACT math subtest benchmark. The other 14 variables all tested as normal distributions.

Results

Since 14 of the variables were normally distributed, the two-tail independent t test, which tests for differences in the means of normally distributed variables (Aldrich & Cunningham, 2016), was conducted to see if there was any significant difference among urban and rural districts. The significant differences with *p* values less than .05 are in Table

8. Notice the percent of AIG subgroup with percent level 5 in the 9-12 grade span had a p value of .05. For all mean differences the urban districts have the larger mean percentage.

Next the Mann Whitney U test, which is the alternative to the independent t-test when distributions are not normal (Aldrich & Cunningham, 2016), was conducted on the variables without normal distributions. The results indicated the percent of AIG subgroup with level 5 in science 3-8 grade span, meeting the ACT composite of 17, meeting the ACT English subtest benchmark, and meeting the ACT Math subtest benchmark did not have significant differences in urban and rural districts.

Table 8

Significant Differences in Learning Outcomes Among Urban and Rural Districts

			95% Confidence Interval of the Difference	
	p	Mean Difference	Lower	Upper
Grades 9-12 % Level 5s	0.05	7.48654	-0.03434	15.00742
% Meeting ACT Science Benchmark	0.03	10.93989	1.04357	20.83621
% Meeting ACT Writing Benchmark	0.001	16.43220	7.06552	25.79888
% Meeting All ACT Benchmarks	0.02	9.97123	1.69536	18.24710
% Meeting All Four ACT Benchmarks (no writing)	0.03	12.03495	1.31212	22.75777

Conclusions

Null Hypothesis Six states there is no significant difference in learning outcomes among urban and rural districts. Results showed there were significant differences among urban and rural AIG students' performances on the ACT science subtest, the ACT writing subtest, all ACT subtests (the sum of benchmarks), all four ACT subtests (no writing), and level 5's on the 9-12 grade EOCs. Therefore, the hypothesis is rejected for these areas and retained for other tested variables.

Relationships Between Opportunities and Learning Outcomes for Gifted Students

Data Collection and Distributions

Null Hypothesis Seven states there is no statistically significant relationship between the percentage of advanced opportunities and the learning outcomes for the gifted student subgroup. The data needed to test this hypothesis has been collected to test previous hypotheses. Learning outcome data was placed in the spreadsheet with opportunity data used to test HO5 giving 3 opportunity data variables and 18 learning outcome variables which resulted in 54 pairings. Since the opportunity data is not normal, all the tests were non-parametric.

The Results

The Spearman Correlation Coefficient Test, which determines if there are any significant relationships between two variables and how strong those relationships are for non-normal variables (Aldrich & Cunningham, 2016), was used since the opportunity data was not normal. Although several significant relationships were found, none were moderate or strong relationships. Table 9 lists the same three values of ρ, p, and n. The strongest significant relationship was between the percent of opportunities offered in a district and the

Table 9

Significant Relationships between Opportunities and Learning Outcomes

		Percent of AP	Percent of Other Opp.	Percent of all Opp.
% Level 5s in District	ρ	.298*	.301*	.348*
	p	0.004	0.004	0.001
	n	90	90	90
% EOG Level 5s	ρ	.280*	.257*	.320*
	p	0.007	0.015	0.002
	n	90	90	90
% Reading EOG Level 5s	ρ	0.152	.248*	.214*
	p	0.152	0.019	0.043
	n	90	90	90
% Math EOGs Level 5s	ρ	.310*	0.202	.321*
	p	0.003	0.056	0.002
	n	90	90	90
% Science EOGs Level 5s	ρ	.271*	.239*	.299*
	p	0.011	0.026	0.005
	n	87	87	87
% EOCs Level 5s	ρ	.233*	.299*	.285*
	p	0.028	0.004	0.007
	n	89	89	89
% Math EOCs Level 5s	ρ	.258*	.240*	.299*
	p	0.019	0.029	0.006
	n	83	83	83
% Biology EOCs Level 5s	ρ	0.034	.287*	0.118
	p	0.765	0.009	0.292
	n	81	81	81
% Meeting ACT Composite of 17	ρ	0.083	.265*	0.150
	p	0.455	0.015	0.175
	n	83	83	83
% Meeting ACT Math Benchmarks	ρ	.250*	0.154	.270*
	p	0.023	0.164	0.014
	n	83	83	83
% Meeting ACT Reading Benchmarks	ρ	0.047	.229*	0.131
	p	0.671	0.037	0.236
	n	83	83	83
% Meeting all ACT Benchmarks	ρ	0.190	.242*	.258*
	p	0.073	0.022	0.014
	n	90	90	90

*Correlation is significant at the 0.05 level number of AIG identified students scoring a level 5 on EOCs or EOGs with a $\rho = .348$ and $p = .001$.

Conclusions

Null Hypothesis Seven states there is no statistically significant relationship between the percentage of advanced opportunities and the learning outcomes for the gifted student subgroup. There were no significant relationships between opportunities and growth of the AIG subgroup. There were significant relationships between all three opportunity variables and the percent of

level 5s in a district, the percent of level 5s on EOGs in grades 3-8, the percent of level 5's on science EOGs, the percent of level 5s on EOCs in grades 9-12, and the percent of level 5's on math EOCs.

Relationships between Financial Resources and Learning Outcomes

Data Collection and Distributions

Null Hypothesis Eight states there is no statistically significant relationship between the amount of financial resources and the learning outcomes for the gifted student subgroup. The data needed for this hypothesis was collected for prior hypothesis testing. None of the financial resource variables have normal distributions, so non-parametric tests were used when they were paired with the 18 learning outcome variables (Aldrich & Cunningham, 2016). Testing was conducted for all 72 pairs of variables.

Results

Spearman's Correlation Coefficient test was used since the financial resource variables did not have normal distributions (Aldrich & Cunningham, 2016). Table 10 includes all significant relationships with the correlation coefficient ρ, significant value *p* and n. It is important to note that both local allotted AIG funds and total allotted AIG funds had

Table 10

Significant Relationships Between Financial Resources and Learning Outcomes

		Total District Budget	State Allotted AIG Funds	Local Allotted AIG Funds	Total Allotted AIG Funds
% Level 5s in District	ρ	0.187	0.205	.244*	.238*
	p	0.078	0.053	0.020	0.024
	n	90	90	90	90
% Reading EOG Level 5s	ρ	0.095	0.115	.245*	0.152
	p	0.375	0.279	0.020	0.153
	n	90	90	90	90
% Science EOGs Level 5s	ρ	.236*	.255*	.267*	.283*
	p	0.026	0.016	0.011	0.007
	n	89	89	89	89
% EOC Level 5s	ρ	0.210	0.199	0.169	.223*
	p	0.056	0.071	0.127	0.042
	n	83	83	83	83
% Math EOCs Level 5s	ρ	.271*	.314*	.266*	.310*
	p	0.014	0.004	0.017	0.005
	n	81	81	81	81
% Meeting ACT English Benchmark	ρ	0.049	0.124	.275*	0.153
	p	0.664	0.269	0.013	0.173
	n	81	81	81	81
% Meeting ACT Math Benchmark	ρ	0.066	0.136	.280*	0.182
	p	0.556	0.220	0.010	0.100
	n	83	83	83	83
% Meeting ACT Reading Benchmark	ρ	0.051	0.123	.318*	0.160
	p	0.645	0.267	0.003	0.150
	n	83	83	83	83
% Meeting ACT Science Benchmark	ρ	-0.009	0.083	.251*	0.117
	p	0.933	0.457	0.022	0.292
	n	83	83	83	83
% Meeting ACT Writing Benchmark	ρ	0.118	0.174	**.471***	.224*
	p	0.286	0.116	0.001	0.042
	n	83	83	83	83
% Meeting all ACT Subtests Benchmarks	ρ	0.126	0.198	.379*	.237*
	p	0.235	0.061	0.001	0.024
	n	90	90	90	90
% Meeting all Four ACT Subtests Benchmarks (no writing)	ρ	0.069	0.154	.332*	0.188
	p	0.537	0.164	0.002	0.089
	n	83	83	83	83

Note. Moderate correlation denoted in boldface.
* Correlations at significance less than .05

significant relationships with a district's percent of level 5s. Local allotted AIG funds also had significant relationships with the percent of level 5s on the reading EOGs, science EOGs, and Math EOCs and with the percent meeting ACT benchmarks in English, math, reading, science, writing, all benchmarks, and all four benchmarks not including writing. The strongest significant relationship is a moderate relationship with ρ = .471 between local allotted AIG funds and the percent meeting the ACT writing benchmark.

Conclusions

Null Hypothesis Eight states there is no statistically significant relationship between the amount of financial resources and the learning outcomes for the gifted student subgroup. The null hypothesis would be rejected for local allotted AIG funds and total allotted AIG funds and

the percent scoring level 5s in a district on EOGs and EOCs. It would also be rejected for all other significant relationships denoted in Table 10.

Identification Process for Districts

Data Collection

To attempt to form a picture of any differences in identification processes among the districts, first each of the 90 districts' identification section of their AIG plans were printed. Then the sections were read and highlighted looking for similarities, differences, and identification procedures found in literature review (ability testing for example). A comprehensive list was assembled, and each plan was reread looking for items from the list missed in the first read. The list was analyzed and most districts' plans for identification were very similar except for ability and achievement testing. Ability and achievement test scores were in every plan in some form, but the difference was the cut-off scores for identification. The lowest score needed for both to qualify was an outlier at 75. All other minimums were 85 or above. The highest needed is 97 for both tests. Most districts have a different score for each of the two types of tests.

Results

To see if there was any difference in urban and rural districts cut-off scores, the ability and achievement test list of minimum scores for identification obtained from the plans were placed in a spreadsheet with the district codes and the mean of urban districts and rural districts was calculated. The results are in Table 11. At least 95% of districts achievement test scores may come from North Carolina state tests or other achievement tests. One district required the test to be a nationally normed test. The types of ability tests are mixed, with many districts' plans not specifying which ability tests are acceptable. The most popular ability test listed is the COGAT 7 which claims to be non-verbal.

Table 11

Urban and Rural Districts' Means of Cut-off Scores

		MINIMUM APT PERCENTAGE FOR ALL PATHS	MINIMUM ACHIEVEMENT PERCENTAGE FOR ALL PATHS
Urban	Mean	87.27	87.09
	n	11	11
Rural	Mean	88.82	89.00
	n	65	65
Total	Mean	88.59	88.72
	n	76	76

The other piece of the cut-off score is what level the test is normed. Most use the nationally normed ability tests and the state normed achievement tests, but a few districts did mention local norming at the district level and one system even normed at the classroom level. Two other districts placed the top subgroup score on EOGs in the AIG pool. Placing subgroup or minority students in the pool does not ensure identification.

The results of analyzing the plans raised two questions relative to this study. Is there a significant difference between cutoff scores among urban and rural districts and do the cutoff scores for ability or achievement tests have a significant relationship with the percent of students identified in a district? Two null hypotheses were written for the questions and the variables were tested for normal distribution. The cutoff scores were not distributed normally, so non-parametric tests were conducted for each null hypothesis.

Hypothesis Nine

H09: There is no statistically significant difference between cutoff scores on ability and achievement tests among urban and rural districts. The Mann Whitney U was used with the district codes as the independent variable and the cutoff scores on ability and achievement tests each as independent variables. The test results were to retain the null hypothesis, so even though the means were different, there was not a significant difference among urban and rural school districts.

Hypothesis Ten

H010: There is no statistically significant relationship between the cutoff scores for ability and achievement testing and the percent of students identified. Since both the cutoff scores and total percent of identified students per ADM were not normal distributions, the two variables for cutoff scores were added to the identification spreadsheet and Spearman's Correlation Coefficient was conducted to see if there was any correlation between the variables. Table 12 contains the significant relationships with ρ, p, and n included. There were two significant results both with negative relationships. The minimum achievement percentile required had significant negative relationships with both the number of Black and Hispanic students identified. This means when the achievement cutoff scores rise, the

Table 12

Significant Relationships between Cutoff Scores and Identification

		Minimum Ability Percentile for all Paths	Minimum Achievement Percentile for all paths
Percent Identified AIG	ρ	-0.020	-0.131
	p	0.865	0.252
	n	78	78
Asian	ρ	0.043	-0.207
	p	0.797	0.218
	n	38	37
Black	ρ	-0.158	**-.377***
	p	0.236	**0.004**
	n	58	**56**
Hispanic	ρ	-0.188	**-.315***
	p	0.141	**0.013**
	n	63	**62**
Multi	ρ	0.014	-0.159
	p	0.919	0.255
	n	54	53
White	ρ	-0.128	-0.165
	p	0.275	0.157
	n	75	75
Female	ρ	-0.011	-0.123
	p	0.922	0.282
	n	78	78
Male	ρ	-0.026	-0.133
	p	0.819	0.247
	n	78	78

Note. Significant results in boldface.

number of Black and Hispanic students identified from the Black and Hispanic students in a district goes down.

Conclusions: Chapter 4

Identification

Some of the results of the study were expected, but some were surprising. Results indicated a significant difference between the percent of students identified from a districts' ADM in urban and rural school districts. There is a significant difference in the percent identified among urban and rural districts for all subgroups except Asian, Black, and Hispanic.

The financial resource factors of total district budget, state allotted AIG funds, local allotted AIG funds, and total allotted AIG funds all have a significant relationship to the total percent identified. There is a strong positive significant relationship between local allotted AIG funds and the percent of male students' ADM identified, and significant relationships between local allotted AIG funds and the percent of White and female students identified. The total allotted AIG funds has strong positive significant relationships with the percent of White ADM and the percent of male ADM identified and a significant relationship with the percent of female ADM identified. Total district budget and state allotted AIG funds each have significant relationships with percent of White ADM, female ADM, and male ADM identified AIG.

Opportunities

Analyses of district AIG plans provided 11 types of opportunities to compare among the districts. The percent of Advanced Placement courses was made its own variable, with the others 10 types being grouped together and a percentage calculated for each district, then all the type of opportunities including Advanced Placement were combined for a third variable with the percentage calculated for each district. The findings from comparing the three variables among urban and rural districts is a significant difference for all three variables with the mean ranks for the percentage of opportunities offered in urban districts much larger than in rural districts.

There are several significant positive relationships between the financial resource variables and the percent of opportunities variables. All except local allotted AIG funds have significant relationships to the percent of all opportunities offered and the percent of AP courses offered. The strongest correlation is between the total district budget and the percent of all opportunities offered. All the significant relationships are positive meaning the less money, the less opportunities.

Learning Outcomes

There are significant differences in learning outcomes among urban and rural districts for the AIG subgroup's performance on the ACT science subtest, the ACT writing subtest, all ACT subtests, all four ACT subtests (no writing), and level 5s scored on the 9-12 state EOCs. All three percent of opportunities variables have a significant relationship with the percent of students scoring level 5s in a district. The percent of all opportunities offered has significant relationships with all EOG and EOC variables except biology EOC and significant relationships with the percent meeting ACT math benchmarks and all ACT benchmarks.

The financial resource variables local allotted AIG funds and total allotted AIG funds both have significant relationships with all level 5s scored in a district. Local allotted AIG funds has a significant relationship with all the ACT learning outcomes with the highest correlation with the percent meeting the ACT writing benchmark.

Financial Resources

For comparing among urban and rural districts the total district budget, state allotted AIG funds, local allotted AIG funds, and total allotted AIG funds were considered. There are significant differences among urban and rural school districts for all four. Local allotted AIG funds and total allotted AIG funds have a higher mean rank for urban districts by almost 30 points. There are many significant relationships between these financial resources and identification, programming opportunities, and learning outcomes.

Chapter 5: Conclusions

This chapter will begin by analyzing and discussing the data and findings relevant to Question One: *What are the effects of context of public school districts on the design and implementation of gifted programming*? The differences in identification and programming opportunities discovered among the districts sampled in this study will be discussed. Next, there is an analysis and discussion of the differences in learning outcomes and the relationships between opportunities for gifted students and learning outcomes identified in this study which are relevant to address Question Two: *What are the effects of differences in design and implementation of gifted programming on gifted student outcomes*? For Question Three: *What are the effects of the public school district's capacity and resulting allocation of resources on gifted student outcomes*, there is an analysis of the difference in financial resources and the relationships between financial resources and identification, programming opportunities, and learning outcomes. Some of the gaps the study addresses along with the conceptual framework are discussed. Finally, the limitations, implications, and recommendations for future research are presented followed by the conclusion.

Question One - Context of the District

What are the effects of context of public school districts on the design and implementation of gifted programming? To answer this question, the study examined identification and programming opportunities among urban and rural school districts. The study tested for any differences in identification and opportunities among the different contexts in urban and rural districts.

For identification, the overall percentage identified AIG in each district is the main variable, but the study also considered subgroup variables for Asian, Black, Hispanic, mulit-race, White, female and male. The subgroup variables represent the specific district's ADM or population of that subgroup. For example, the variable *Asian* represents the number of Asian students identified out of the number of Asian students in the district's ADM. *Black* represents the number of Black students identified out of the number of Black students in the district's ADM. *Multi-race* and *White* represent the same for each of their subgroups. *Female* represents the number of female students identified out of the number of female students in the district's ADM and *male* represents the number of male students identified out of the number of male students in the district's ADM.

The overall opportunity variable is most important, but the study also considers the percentage of AP courses and other opportunity variables without AP courses. The variable *percent of AP* represents the number of AP courses offered in the district, not including NC Virtual School, NCSSM, or other outside sources, out of the number of courses available. *Percent of other opp.* represents the number of points from the other opportunities offered in the district as shown in Table 2 in chapter 4 out of the total number of points possible. *Percent of all opp.* is the number of AP courses offered plus the number of opportunity points from Table 2 out of the total number of possible AP courses plus the total number of points possible.

The study also examined each district's AIG plan (NCDPI, 2019c). The plans' identification sections were examined to see if there were differences in factors for identification. Each plan's programming sections were analyzed to find the opportunities available, which determined the opportunity variables.

Significant Difference in Identification

I believe identification might be the most important factor in the study, since many of the opportunities addressed in the district plans are simply not available to the students who are not properly identified as AIG, for whatever reason. In other words, the student may be gifted but cannot be appropriately served due to contexts that might not meet national or other criteria designated by the district (Azano et al., 2017). This is a particularly worrisome variable since districts may often differ in their identification criteria as there is no state standard for identification. This study found a significant difference between urban and rural districts in the percent of a district's ADM identified AIG. The results indicate the urban school districts identified a higher percentage of their ADM which might indicate an equity issue between identification in urban and rural districts (Brown & Garland, 2015; Coleman & Shah-Coltrane, 2015; Gallagher, 2015). There was also a significant difference between urban and rural districts and the percent identified from the ADM of subgroups: Multi-race, female, and male.

VanTassel-Baska (2015, 2018) suggests the definition of giftedness in many states is outdated and vague. Even in North Carolina, which Gallagher (2015) called an exemplar state for AIG students, there are standards given for identification with each district writing different plans to meet those standards. A review of each of the identification sections of these plans (NCDPI, 2019c) revealed over 95% of districts use an ability score and an achievement score for identification.

Research suggests that although most agree there should be a multiple measure approach for identification, they do not agree what those measures should be or what the minimum score or cutoff score should be to qualify for AIG identification (Azano et al., 2017; Moore & Shenk, 2017). Moore and Shenk (2017) suggest ability tests (or IQ tests) should never be used since they are not stable and are influenced by the environment. Yet, the plans revealed that even when multiple measures were included, the main difference in a student being identified or not was the scores on these tests. This study's results agree with

Plucker and Callahan's (2014) belief that, "Simply using more measures is not as important as how those measures are actually used" (p.395). Not only do the cutoff scores for ability tests and achievement tests need further research, but how the scores are normed (national norms, state norms, or local norms) could also be contributing factors to a higher percentage of urban districts' students being identified (Azano et al., 2017; Plucker & Callahan, 2014; Swanson & Lord, 2013).

Since there was not a significant difference in urban and rural schools and the percent of the ADM of Black students, Hispanic students, or Asian students, it raises questions concerning inequities in these areas. There is significant research on the topic and how to neutralize the inequities for minority groups (Cao, Jung, & Lee, 2017; Plucker & Callahan, 2014; Swanson & Lord, 2013). A quick look at the means of each for all the districts indicated that the problem still exists. The data indicates all districts, both urban and rural, still have major issues when it comes to identifying equitable percentages of Black and Hispanic students based on ADMS. The districts tend to identify a much higher percentage of Asian students based on ADMs. More research is still needed to address this inequity among all districts in terms of identification of AIG within specific subgroups of student populations. This leads to further research inquiry into the cultural biases of identification measures currently in place in North Carolina districts.

A significant relationship was discovered between the minimum scores required by each district on achievement testing for identification and the percent of Black students' ADM and Hispanic students' ADM identified, but there was not a significant difference in urban and rural school districts and the minimum scores for either ability or achievement. This raises the question if the required scores are the same, then why are less students meeting those cut-offs in rural districts and why is there still a significant relationship between those scores and the identification of Black and Hispanic students?

The answer most likely lies with the norming of the tests. According to Azano et al. (2017), Moore and Shenk (2017), Plucker and Callahan (2014), and VanTassel-Baska (2015), locally norming the tests could help solve this issue. Most ability tests that produce IQ scores are nationally normed, and most districts used the state level normed achievement tests scores or worse nationally normed achievement tests. Rural students, including Black and Hispanic students, and Black and Hispanic students from either rural or urban districts would have a better chance of being identified if they were compared to students with the same opportunities and backgrounds (Azano et al., 2017), thus further supporting a suspicion of cultural bias among test items. The study indicated a significant difference in opportunities between rural and urban districts. Therefore, locally norming these tests, including norming for subgroups, may offer a strategy for reducing the impact of bias resulting in identification gaps.

Significant Difference in Programming Opportunities

There is a significant difference among urban and rural districts in the percentage of opportunities offered. Advanced Placement (AP) courses are the most common form of subject-based acceleration (Plucker & Callahan, 2014). The number of high school courses offered to middle school students is another subject-based acceleration opportunity addressed in the study (Plucker & Callahan 2014; VanTassel-Baska, 2018). Data regarding whether a district offers prescriptive nurturing programs in K-3 or International Baccalaureate (IB) courses in middle or high school factored into an examination of the opportunities offered within each district (Tomlinson, 2013; Wu, 2017).

Wu (2017) presented negative research on pull-out programs and the ineffectiveness of differentiation in the regular classroom for elementary students. VanTassel-Baska's (2018) research indicated that teachers in heterogeneous classes spend most of their time working with struggling students. Wu (2017) and VanTassel-Baska's (2018) research helped frame the factors used in forming the opportunity variables. When we looked at AP courses, other opportunities, and a combination of both among urban and rural districts, urban districts tended to offer more opportunities for their AIG students.

Conclusion

Differences in identification and opportunities are two of the effects of differences in context among urban and rural school districts. Since the study recognized these differences, the next logical question is are these differences relevant?

Question Two – Effects of Differences in Design and Implementation

What are the effects of differences in design and implementation of gifted programming on gifted student outcomes? To answer this question, the study focused on the three opportunity variables examined for Question One. All three exhibited significant differences among urban and rural districts with the urban districts having more opportunities including AP courses. The study looked for any relationships between the opportunity variables and the learning outcomes for the subgroup AIG. First, the study tested for any differences in the learning outcomes among urban and rural school districts. Then the opportunity variables and learning outcome variables were examined for any significant relationships.

Significant Differences in Learning Outcomes

Data analysis revealed a significant differences in learning outcomes among urban and rural districts for the percent of AIG subgroup scoring level 5's at the high school level, the percent meeting the benchmarks for the ACT science and writing subgroups, and the percent meeting the ACT benchmarks for all benchmarks and the four subtests (no writing). The differences at the high school level and on ACTs between rural and urban districts mirrors the results of Plucker, Hardesty, and Burroughs (2013) where they suggested in rural districts the excellence gap can be compounded by lower socioeconomic students not being identified and therefore not getting access to as many opportunities. Plucker, Hardesty, and Burroughs (2013) found poor gifted students did not achieve at the same level as other gifted students. Since the opportunities in rural districts were found to be significantly less than those in urban districts, this compounds the effect on poor rural gifted students.

The results seem to partially confirm the findings of Hernández-Torrano (2018) who indicated identified gifted students in rural areas scored lower than those in the gifted subgroups of urban areas. Although there were not significant differences for all learning outcomes, there was an excellence gap detected at the high school level. Significant differences were found for level 5's at the high school level EOCs and a few of the ACT subgroup benchmarks for the districts included in this study.

There was no significant difference in the growth index for AIG students among urban and rural school districts. In fact, the means of the two groups are both negative indexes indicating that the average AIG student lost ground in all districts. The urban districts average index was actually lower at mean = -.2674 for urban versus mean = -.2278 for rural. This reinforces Plucker and Callahan's (2014) suggestion that we are allowing our gifted students to "slip" (p. 400).

Opportunities Relationships to Learning Outcomes

Gap in research. It is important with the significant difference in opportunities among urban and rural districts to consider if there is a relationship between these opportunities and the learning outcomes. This is where a gap exists in the research. I could find studies on the best programming and opportunities to offer students (Renzulli, 2016a, 2016b; Tomlinson, 2014, 2017a, 2017b), but specifically looking at relationships between programming and AIG students' outcomes on this large of a scale was missing in the literature. There was one study in South Carolina, but it focused on identification and minority students (Swanson & Lord, 2013).

Results. The study revealed significant relationships between all three opportunity variables and the percent of level 5s on EOGs and EOCs in a district, the percent of level 5s for grades 3-8 EOGs, the percent of level 5s on the science EOGs, the percent of level 5s for grades 9-12, plus the percent of level 5s on math EOCs in grades 9-12. In addition, the percent of AP courses offered had a significant relationship with the percent of level 5s for math EOGs in grades 3-8. Percent of all opportunities also had significant relationships with percent of level 5s for both math and reading EOGs grades 3-8. The percent of opportunities not including AP courses is the only variable that had significant relationships with any ACT outcomes. The percent of opportunities not including AP courses had significant relationships with the percent making a 17 or higher on the composite score of the ACT, the percent meeting the ACT reading benchmark, and the percent meeting all ACT subtests benchmarks.

Conclusion

The study showed significant differences in five learning outcomes all from high school students among urban and rural districts. It also showed significant relationships between all three opportunity variables and the percent of level 5s on EOGs and EOCs in a district. The main opportunity variable, percent of all opportunities, had a significant relationship with all the EOC and EOG outcome variables except Biology. Only the percent of other opportunities without considering AP courses had any significant relationships with ACT results. The percent of other opportunities had a significant relationship with the percent meeting the ACT composite score of 17. Both urban and rural districts have gifted students losing ground with negative growth index averages. There is an excellence gap between urban and rural high school AIG students in North Carolina.

Question Three – Effects of Capacity and Financial Resources

What are the effects of public school district capacity and resulting allocation of resources on student outcomes? To best answer this question, the study considered if there were significant differences in total district budget, state allotted AIG funds, local allotted AIG funds, and total allotted AIG funds among urban and rural districts. Next these four variables were compared with identification variables, opportunity variables, and the learning outcome variables to see if there were any significant relationships.

Significant Differences in Financial Resources

Significant differences among urban and rural districts were found for all four financial resource variables: total district budget, state allotted AIG funds, local allotted AIG funds, and the total allotted AIG funds. Urban districts had the higher average financial resources. AIG funding is an issue in the United States with no federal funding and even in the few states that do fund no legislative requirements on how the money is spent (Plucker & Callahan, 2014; Van Tassel-Baska, 2015). Previous studies by Kettler et al. (2015) and VanTassel-Baska, (2015) have suggested rural districts may allocate a smaller amount of the budget for gifted education.

Financial Resources Relationships to Identification

There were positive significant relationships found between all four financial resources variable and the percent of a district’s ADM identified as gifted, with local funds having the strongest relationship. There were also significant relationships between all four financial resource variables and the subgroup identification variables: White, female, and male. The strongest significant relationships were between total allotted AIG funds and the subgroups White and male. The relationship between local allotted AIG funds and the subgroup male was the other moderately strong relationship. All the relationships were positive, meaning as the financial resource variables increased, the percent of identified students increased. It is concerning but expected that there is a difference in funding among urban and rural districts, but even more concerning to know urban districts having the larger average financial resources is related to urban districts identifying a larger average of their ADM as gifted.

Financial Resources Relationships to Opportunities

The study also revealed positive significant relationships between the total district budget, the state allotted AIG funds, and the total allotted AIG funds when compared with the opportunities offered in the districts. The strongest significant relationship was between the total district budget and the percent of all opportunities offered in a district, with the total allotted AIG funds relationship to the percent of all opportunities offered in a district the second strongest. With financial resources among urban and rural districts showing a significant difference, the idea that funding is a major issue for rural school districts is supported when identification and opportunities are related to financial resources or the lack thereof (VanTassal-Baska, 2015).

Financial Resources Relationships to Learning Outcomes

Tests indicated the state allotted AIG funds, the local allotted AIG funds, and the total AIG allotment for each district all had significant relationships with the percent of level 5s in 9-12 grade and on biology EOCs. Local AIG funds and the total AIG allotment had a significant relationship with 40% of the learning outcome variables. Although these were weak relationships, it still raises a concern when financial resources are significantly different among urban and rural districts. The significant relationship between total allotted AIG funds and the percent of level 5s in a district is the most concerning. Plucker, Hardesty, and Burroughs (2013) suggest that poor gifted students do not achieve at the same level as other gifted students. The results from this study indicate that students from districts with less money spent on AIG students do not perform as well as those from districts that spend more money. Moreover, the study shows the rural districts have less financial resources than the urban districts. If those poor gifted students are attending school in rural districts, it seems their troubles could be compounded.

Conclusion

It is distressing with a significant difference in financial resources among urban and rural districts, that there are significant relationships between financial resources and identification, opportunities, and learning outcomes. Kettler et al. (2015) and VanTassel-Baska (2015) discuss fewer local monies in rural district to meet the needs of all students and this study suggests a significant difference in local monies for AIG among urban and rural districts with rural districts not receiving as much as urban districts. Some of the relationships might be even more detrimental to rural districts if we consider the financial resources allotted for AIG might be spent to meet the needs of all students in rural districts by paying for a teacher’s salary with only a few AIG students in the classroom (Kettler et al., 2015; VanTassel-Baska, 2015).

Gaps in Research

These results fill a gap in the research. Kettler et al. (2015) looked at differences in rural and urban resources and opportunities, and VanTassel-Baska (2015) looked at inequalities in resources and opportunities for gifted students. Limited research looked at relationships between resources, opportunities, and learning outcomes specifically for gifted students.

There is a gap in gifted education research according to Azano, et al. (2017) and Plucker and Callahan (2014). Both call for more research including repetition to increase the validity of gifted education. Gifted education is a newer concept and more valid research might help improve stakeholders' attitudes and beliefs (Wu, 2017).

Conceptual Framework: Excellence and Opportunity Gaps Through the Urban Versus Rural Lens

While Kettler, Puryear, and Mullet (2016) strongly suggested defining urban and rural in research; Kettler, Russel, and Puryear (2015) suggested there were inequities in accessing gifted education based on contexts of schools. Looking to see if those inequalities existed in urban and rural districts in North Carolina was considered when Hernandez-Torrano (2018) suggested there were excellence gaps between urban and rural schools. The excellence gaps possibly being affected by opportunity gaps was further considered with Hardesty, McWilliams, and Plucker's (2014) look at these gaps among other contexts. These ideas framed the studies search for possible inequities among urban and rural districts.

Renzulli (2016a, 2016b) inspired the study to consider identification as an opportunity itself, due to identification issues leading to unequal access to other opportunities. Renzulli (2016a, 2016b) and similar researchers provided a framework of opportunities to consider during the study (Coleman, 2014; Plucker & Callahan, 2013, 2014; Redenius & Skaar, 2017; Sailor, McCart, & Choi, 2018; Sousa & Tomlinson, 2018; Tomlinson, 2017a). Gallagher (2015) and Kettler, Russel, and Puryear (2015) along with others discussed the inequities that framed the study. These framed the studies look at possible inequities in identification and programming opportunities due to different contexts among public school urban and rural school districts and the possible effects of any inequities (Callahan & Hertberg-Davis, 2013; Colangelo et al., 2004; Plucker et al., 2013; Van-Tassel Baska, 2015; Wu, 2017).

Limitations

Multiple Definitions of Urban and Rural

One of the most limiting factors to this study was having to choose how to define urban and rural districts. There are many definitions for urban and rural when discussing counties and schools. One must wonder if I had chosen differently would my results be different. The only way to attempt to address this limitation was to use the definition for urban and rural schools from the National Center for Education Statistics (NCES, 2019) and to specify how I defined urban and rural districts (Kettler et al., 2016).

Test Bias used in Data

Test bias is a limitation when considering identification data and learning outcome data. Cutoff scores were considered in the discussion of identification among the districts, but the fact that districts use different tests, many considered bias, for identification was a factor too broad to consider in this study (Garcia, 2015; Scheiber, 2016). The ACT scores used as learning outcome data are questioned not only for predicting college performance but as a legitimate measure of student's knowledge especially for Black students (Robinson, 2017; Toldson & McGee, 2014).

Access to Social and Economically Disadvantaged Data

This study did not have access to data for AIG students who are socially and economically disadvantaged. Most states do not have any data specifically for AIG students.

Due to FERPA (USDE, 2019) laws, trying to keep the privacy of both AIG students and those AIG students socially and economically disadvantaged is difficult.

Mobility of Students

Another limitation is mobility of students. The study considered district level data when many times the student may have only been in the district the year the data was pulled. Students moving from district to district for multiple reasons and those moving into the state are factors in this limitation. The population of migrant students in many areas also contribute to this limitation.

Financial Resources

A true picture of financial resources directly affecting AIG identified students is not possible. For rural school districts, Kettler et al. (2015) and VanTassel-Baska (2015) reminds us with no specific laws on how allotted AIG funds are spent, rural districts may use it to meet the needs of all students in the district. Results of this study indicate rural districts have a lower amount of financial resources than urban districts, but there is no way to know if those resources are truly spent on the AIG students.

Other Contributing Factors

When considering data from the district level there are many more possibilities of limiting factors. One example that could not be addressed by this study is a large grant provided by a company to a very small rural district. Other factors beyond the scope of this study would be major industries in a rural district. For example, a district that could not be labeled urban or rural has Google in their district. The contributions of Google to that district would have skewed results if it had been included in the study. When considering 115 public school districts covering 100 counties, it is probable other contributing factors were not considered; therefore, a correlative not causal study was conducted, and the results are not generalized.

Implications

Inequities in Identification

The study indicated there were inequities found in identification among urban and rural districts. There are two suggestions from the literature that could begin changing these numbers. One is using local norming on tests used as factors in identification (Azano et al., 2017). If ability and achievement tests must be a factor, norming them so students are compared to others with the same culture and opportunities would increase the chances of identification. Serving the top 20% of a grade level in the district would be a good start. Even better would be serving the top 20% of students in a grade level in a school. This could be done without more expense if all students in a grade level were already being tested (Azano et al., 2017).

An even better suggestion would be to not use biased ability and achievement tests for identification (Garcia, 2015; Scheiber, 2016). Responsiveness to Instruction (RTI) has morphed into the Multi-tiered Student Support System (MTSS) in North Carolina. It is not a program for struggling students, but a way of identifying a student's individual needs whether it is intervention, more challenging material, or anywhere in between (Redenius & Skaar, 2017). Using the school level team to not only identify students that need intervention, but to identify gifted students would allow all factors including culture and contexts to be considered.

Inequities in Opportunities

The study revealed there were opportunity gaps among urban and rural school districts. Financial resources, which are almost impossible to change anyway, were shown to only have weak significant effects on the opportunities offered. The only way to give rural students more opportunities is to change the mindset of rural communities and schools. Truly individualizing student's education using different types of differentiation and acceleration would allow rural students to move at their own pace. Sitting in inclusion classrooms where the emphasis is on struggling students is not appropriate for gifted students, and there are not enough identified students in many rural schools to have ability grouped classes of gifted students (Wu, 2017). RTI was designed to meet all students needs in a classroom (Redenius & Skaar, 2017). Once identified, AIG students should be placed based on their individual needs even if it is in another grade level for part or all of the school day. If in the inclusion classroom, AIG students need individualized instruction with *authentic* differentiation, small groups, or contracts (Plucker & Callahan, 2014; Tomlinson, 2014; Wu, 2017).

Acceleration is an excellent way to increase opportunities for students in rural school districts (Colangelo et al., 2004; Siegle et al., 2013). Stakeholders have unfounded beliefs and perceptions of acceleration based on myths and lack of knowledge (Siegle et al., 2013). One myth is that acceleration causes emotional and social damage to gifted students, but research reveals the opposite and suggests acceleration increases confidence and accelerated gifted students have good social outcomes (Colangelo, et al., 2004; Siegle et al., 2013). Stakeholders believe acceleration is only grade skipping and need to be informed of the more than 19 approaches falling under the umbrellas of subject-based or grade-based acceleration to increase buy in (Siegle et al., 2013). Acceleration can be used at little to no cost to a district, but without leaders making informed decisions and leading others to do the same, it is an opportunity lost to rural gifted students (Colangelo, et al., 2004; Siegle et al., 2013).

Leading Change

To address the inequities in identification and opportunities among urban and rural districts will require leaders of change. With the emphasis on test scores and struggling students, leaders will have to take the chance and move away from the traditional classrooms, schedules, and lectures (Brown & Garland, 2015; Coleman, 2014; Gallagher, 2015; Tomlinson, 2017b). If teachers are told they will have to individualize their student's instruction, they will see 30 different lesson plans. Information, training, and follow up will have to occur in order for the teachers to understand that some lessons will only need three groups of students and how to structure their classroom where they can work with each group while the others are working on their own or with another teacher somewhere else (Tomlinson, 2017b). Tomlinson (2017b) discusses many ways to individualize instruction without 30 lesson plans.

Leaders need to seek understanding and training themselves. If they go into classrooms and do not know what to look for, how can they help teachers? The days of observing teachers with the students in orderly rows listening to a lecture need to end if equity is ever expected to exist among all students, especially for AIG students among urban and rural districts.

Leaders need to find out the facts about acceleration and study the research, then share with all stakeholders (many principals still belief myths about acceleration). It is a very cost-effective way of providing more opportunities to rural gifted students and should be utilized to individualize their instruction (Colangelo et al., 2004; Siegle et al., 2013).

Recommendations for Future Research

Azano et al. (2017) and Plucker and Callahan (2013, 2014) call for more empirical research in gifted education. Azano et al. (2017) specifically call for research in identification. Plucker and Callahan (2013, 2014) call for investigation into RTI interventions and their use for advanced students.

Research on identification would need to include locally norming tests. If a researcher could show that local norming would increase the percent of students identified in a district, it might influence other rural districts to locally norm. It would also be helpful to research if norming by subgroups and identifying the top in each subgroup would help close the gap between the percent of White students of White students' ADM and the percent of Black students of Black students' ADM.

The study indicated that although there was not a significant difference in growth among urban and rural school districts AIG students, the average growth for all AIG students was negative. This is a problem that needs further research. One might combine this research with research on individual instruction.

With MTSS being so new in North Carolina, it leaves a large research gap, especially as to how it can benefit gifted students in both identification and programming. Research could show if using MTSS school level teams to identify gifted students will help increase the numbers identified in rural districts. Long range research comparing schools or districts authentically individualizing instruction for all students including AIG and those only using MTSS to meet the needs of struggling students would be beneficial. Research into specific interventions or *upperventions* and their effectiveness would also be worthwhile in growing the field of gifted education.

Conclusions: Chapter 5

Gallagher (2015) along with Brown and Garland (2015) argue that all gifted students should be challenged and given the opportunity to grow. This implies equity for all gifted students regardless of whether they attend school in an urban or rural school district. This study sought inequities in identification, programming, and financial resources associated with gifted students in urban and rural North Carolina school districts. The study delved into learning outcome data for North Carolina's gifted students' (AIG) subgroup to determine if there is a significant difference in rural or urban school districts' percent scoring level 5s on state EOG and EOC tests and the percent meeting benchmarks on the ACT composite scores and subtests. The study then analyzed the inequities discovered in identification, programming, financial resources, and learning outcomes and discovered significant relationships relating to attending urban and rural school districts. Data analysis from 10 hypotheses were used to answer the following questions:

(1) What are the effects of context of public school districts on the design and implementation of gifted programming?

(2) What are the effects of differences in design and implementation of gifted programming on gifted student outcomes?

(3) What are the effects of public school district capacity and resulting allocation of resources on gifted student outcomes?

The study found inequities in the percent of students identified, the percent of programming opportunities offered, financial resources, and some learning outcomes among urban and rural school districts. Urban school districts identified a higher percentage of their ADM, offered a higher percentage of opportunities, and had more financial resources for AIG students. Urban school districts also had better learning outcomes for: percent of level 5s in grades 9-12, percent meeting ACT science benchmark, percent meeting ACT writing benchmark, percent meeting all ACT benchmarks, and the percent meeting four ACT subtests benchmarks (writing not included).

The study also revealed significant relationships between the percent of opportunities offered and learning outcomes. In urban districts, which were found to have more opportunities, there was a higher percentage of level 5s on EOGs and EOCs. Further, the study discovered significant relationships between financial resources and both the percent identified and percent of opportunities. Urban districts were found to have more financial resources which was related to having a larger percent of students identified and more programming opportunities. Significant relationships were found between all four financial resource variables and the percent of level 5s in 9-12 and biology. Again, urban districts were found to have more money and therefore a larger percent of level 5s in all EOCs and in biology EOCs.

When investigating the identification sections of the districts' AIG plans, a difference in cutoff scores among the districts was discovered. No significant difference was found between the cutoff scores among urban and rural school districts, but a negative significant relationship was found between the cutoff scores and the identification within the subgroups Black and Hispanic. This indicated the higher the cutoff scores, the less Black and Hispanic students were identified.

These findings indicate that the effects of the context of urban and rural school districts are inequities in identification, programming opportunities, financial resources, and some learning outcomes among the two groups. These inequalities relate to inequalities in the learning outcomes among urban and rural districts. Inequalities in opportunities relate to the inequalities for percent of level 5s on EOGs and EOCs among urban and rural districts. Inequalities in financial resources relate to inequalities for percent of level 5s on EOCs among urban and rural districts.

These inequalities need to be addressed. Strong leaders need to take steps to make changes from policies that address the needs of all and not just the needs of struggling students to individual rural classrooms that concentrate on all students' needs (Azano, et al., 2017; Brown & Garland, 2015; Gallagher, 2015; Plucker & Callahan, 2013, 2014; VanTassel-Baska, 2018). If we continue to ignore these inequalities and leave many of our gifted students sitting bored in classrooms where teachers are attending to the needs of struggling students, it will not be no child left behind, but a nation left behind.

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Vita

Teresa Joyce Smeeks spent her childhood in Dawson Springs, Kentucky with her parents, Raymond Wayne and Betty Lou Hamby, and her older siblings, David and Janet. She graduated from Dawson Springs High School in May 1985. She then attended Western Kentucky University where she earned her Bachelor of Arts in Math Education in August of 1992.

After moving to Nashville, Tennessee to teach at John Overton High School, she met her husband, Frank Chase Smeeks, who was a medical student. She preceded to teach in several states as she followed him with their two children, Jessica Diane and Frank Chase, through his education, residency, and first position in Morganton North Carolina. While teaching in Burke County Schools in North Carolina, Teresa took courses in Gifted Education and the certification was added to her North Carolina teaching license. She then began her Master’s degree in Supervision and Administration from Appalachian State University and completed the degree in December of 2006.

She began her Educational Specialists degree online while living in Greenville, SC and then completed it in August 2016 while serving as a Director in Alexander County Schools. In the fall of 2017, she began her courses for her Educational Doctorate at Appalachian State University. While keeping their mountain house in North Carolina, Teresa went between there and their new home in Savannah, Georgia as she completed her degree in the Spring of 2020.