Increasing Access to Rigorous Coursework: North Carolina Policy Impacts on Diversity in Advanced Math Courses

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Executive Summary

The North Carolina General Assembly (NCGA) enacted Session Law 2019-120 (SL 120) in August 2019 to be implemented by districts by December 2021. This report measures the potential impacts of SL 120 on under-identified student groups placed into 8th-grade Algebra 1. The term "under-identified student groups" refers to student groups that have been traditionally under-identified for advanced coursework. In this report, under-identified student groups include students with Economically Disadvantaged Status (EDS), black and Hispanic students, and students enrolled in Non-Metro school districts. "Well-represented student groups" refers to those students who have been historically enrolled in advanced courses at high rates: students with Non-EDS, white and Asian students, and students enrolled in Metro school districts.

To estimate the potential impacts of SL 120, this report measures the number of 7th-grade students who earned the highest proficiency level on the Math End-of-Grade (EOG) test during the 2016-2017 school year but were not enrolled into 8th-grade Algebra 1 during the subsequent 2017-2018 school year. By identifying the number of students in this group, this report estimates how many students may be directly impacted by SL 120 when the legislation is implemented in 2021. This report also assesses the demographic and geographic characteristics of those students to determine which student groups might benefit most from the legislation when school districts implement it in 2021.

The NCGA enacted SL 120 with the intention of broadening access to advanced math courses and ensuring that eligible students are not overlooked for those opportunities (North Carolina Department of Public Instruction 2019). Other states have taken similar action to increase the proportions of under-identified students identified for advanced learning opportunities (National Association of Gifted Children 2013). This report provides insight into whether the goals of SL 120 may be realized based on a simulation of the legislation's full effects if it had been implemented at the beginning of the 2016-2017 school year instead of the 2020-2021 school year. This report can also inform policymakers across the nation about the potential impacts of similar legislation intended to address unequal access to advanced math courses.

Specifically, this research is interested in determining the demographic and geographic characteristics of students who earned the highest proficiency level on the 7th-grade Math EOG test but were not placed into Algebra 1 in their subsequent 8th-grade year. Evidence suggests many reasons for the racial and ethnic disparities in advanced course enrollment. Some research posits that racial or ethnic biases among school staff about student ability may impact the likelihood that a student is recommended for advanced courses (Wright, et.al. 2017). Policies like SL 120 aim to reduce the impact of negative bias of school staff by increasing reliance on test performance for placement determinations.

There are two major caveats to the assumption that SL 120 will remove negative bias from the identification process. First, the language and context of standardized tests themselves may inherently privilege certain student groups over others (Card and Guiliano 2014). Secondly, test performance alone does not always correlate with ability to succeed in advanced courses. Therefore, a policy that relies heavily on test performance for identification may favor certain student groups who historically perform better on standardized tests. On the other hand, SL 120 would not identify students who underperform on standardized tests despite higher potential ability. These scenarios highlight the importance of maintaining positive teacher recommendations as part of the identification process for advanced course enrollment.

SL 120 uses specific language referring to “advanced learning opportunities” and “advanced courses,” rather than “gifted services.” The historical purpose of gifted education has been to ensure that all students have access to appropriately rigorous coursework. Approaches to achieve that end have varied across history and locale. SL 120 represents one modern attempt to promote equitable course placement. SL 120 does not only apply to gifted students, but its goals largely mirror the central purposes of gifted education. Therefore, examining historical gifted education policy provides valuable support in understanding contemporary course placement practices today.

I. Policy Question

This report measures the number of students and the characteristics of students who earned the highest proficiency level on the 7th-grade Math EOG test during the 2016-2017 school year but were not placed into 8th-grade Algebra 1 during the subsequent 2017-2018 school year. Under SL 120, students who earn the highest proficiency level on the 7th-grade Math EOG test will be automatically enrolled into 8th-grade Algebra 1 during the subsequent school year. This report also provides an estimate of the number of students and the characteristics of students who may be enrolled into 8th-grade Algebra 1 as a direct result of SL 120 when districts implement it by December 2021. Although this research offers only an estimate of SL 120's impact, it offers valuable insight into advanced course placement trends across North Carolina that can inform future policy decisions.

II. Client Information

This report estimates SL 120's potential impact on 8th-grade Algebra 1 enrollment for public school students across North Carolina. The North Carolina Department of Public Instruction (NCDPI) served as a thought-partner to aid in understanding of the current education landscape in the state. NCDPI's public databases and webinars provided supplemental information for this report including Average Daily Membership (ADM) data and Academically and Intelligently Gifted (AIG) data. The raw data analyzed for this report comes from the North Carolina Education Research Data Center (NCERDC) and represents statewide, student-level information for the 2016-2017 and 2017-2018 school years. More information about the data used in this report can be found in the Data Appendix section.

III. Issue Background

Problems of Under-Identification

Black and Hispanic students are often under-identified for advanced coursework, while white and Asian students are usually well-represented in advanced courses. Research suggests that this disparity in access to rigorous coursework is beyond statistical chance (Ford 2014). In North Carolina, for example, one study found that white 7th-graders were 20 percent more likely than the grade average to take accelerated middle school math. Black and Hispanic 7th-graders took accelerated middle school math 30 percent and 17 percent less often than the grade average (Clotfelter, et.al. 2020). This disparity in access to advanced math coursework in middle school often has lasting impacts for under-identified students (Dougherty, et.al. 2017).

If students follow the standard math course of study in North Carolina, they will not take Algebra 1 until 9^{th} grade (State Graduation Requirement Policy n.d.). When students do not take Algebra 1 prior to 9^{th} grade, they are less likely take advanced math and science courses in high school, leading many to believe that Algebra 1 is the foundation for students' future success in science, technology, engineering, and Math (STEM) (United States Department of Education 2018). Across the United States (U.S.) in 2015, only 24 percent of 8th-graders took Algebra 1 (United States Department of Education 2018). Of this group, Asian and white students took Algebra 1 at higher rates than black and Hispanic students. This data highlights the uneven access to and enrollment in middle school Algebra 1 that may negatively impact students long-term.

The systematic under-identification of black and Hispanic students for advanced math coursework carries lasting consequences for all students and the larger society. When students are not academically challenged, they are more likely to be unengaged with the course content and display disruptive behavior in class (Dougherty, et.al. 2017). As a result, the under-identification of black and Hispanic students for advanced courses also contributes to the racial achievement gap (Card and Guiliano 2014). Some research goes as far as to suggest that the underrepresentation of black and Hispanic students in advanced courses represents a modern form of school segregation (Ford 2014; Clotfelter, et.al. 2020). Larger social and economic contexts influence the disparate academic outcomes of students of different races and ethnicities, but school-level policies and practices regarding course placement also impact the achievement gap (Grissom and Redding 2016).

Advanced math coursework can affect college and labor market outcomes, yet discretionary placement policies can lead to differential access at key points in the college preparatory pipeline (Dougherty, et.al. 2017). Evidence suggests that access to advanced math courses increases the fraction of relatively low-skilled middle schoolers later enrolling in Precalculus (Ibid). These increases were larger for low-income students and female students. Access to advanced math courses in middle school also increases college readiness and intentions to pursue a bachelor's degree (Ibid). Evidence suggesting abundant positive benefits of advanced course placement has led many states and districts across the U.S. to adopt new methods of identifying students for advanced coursework (National Association of Gifted Children 2013).

Solutions to Under-Identification

Some states have attempted to address the negative impacts of teacher bias on student placement in advanced courses in several ways. Select research suggests increasing the proportion of teachers of color in schools with majority students of color to promote equitable course placement (Gershenson 2019). Evidence on the effects of student-teacher race match suggest that black students are more likely to be identified for gifted services by black teachers (Ibid). This finding emphasizes that a teacher's social bias about student ability may impact the probability of recommending a student for gifted services or advanced coursework. Similarly, evidence has also shown that larger proportions of black and Hispanic teachers correlate with more equitable placement of black and Hispanic students in gifted education programs and advanced math courses (Grissom and Redding 2016).

As a result, this research proposes hiring black and Hispanic teachers to increase the representation of black and Hispanic students in gifted programs. While teacher recommendations are a central tenant of gifted identification, teachers must be effectively trained on how to identify students. Part of this training involves understanding one's own subconscious biases and the unique characteristics of students with different cultural identities. Therefore, adding a handful of black and Hispanic teachers may not be sufficient to ensure equitable representation in a school's gifted program and advanced courses.

First, a critical mass of teachers of color is necessary for teacher race or ethnicity to be associated with higher representation of students of color in gifted programs. According to some studies, schools would have to increase the number of black and Hispanic teachers by twenty to thirty percent of existing numbers (Grissom and Redding 2016). Even if schools could consistently secure diverse teachers, they would still need to implement anti-bias training to equip teachers to properly identify gifted students from traditionally under-identified groups. Therefore, many districts face significant barriers to securing a sufficient number of quality teachers of color and providing adequate training around cultural bias.

Likely because of these challenges, many states and districts favor other approaches to promoting equitable course placement. Many states have enacted less discretionary course placement models that put greater emphasis on test scores for placement determinations. Yet, some research suggests that testing instruments may underwrite much of the racial disparity in gifted education identification because of inherent cultural bias (Ford 2014). Researchers hypothesize that achievement tests often privilege certain racial and ethnic groups who, on average, perform better on those tests. Therefore, state policies must encourage districts to utilize multiple methods of identification to increase the likelihood that under-identified student groups have access to appropriately challenging material.

Policies that aim to balance the racial and ethnic distribution of students in advanced courses offer an approach to addressing the racial achievement gap. By enacting policy to promote proportional representation in advanced courses, schools can reduce achievement gaps and racial segregation (Card and Guiliano 2014; Ford 2014; Wright, et.al. 2017). Yet to build effective policies, decisionmakers must understand the factors that contribute to these phenomena; namely the inherent bias of standardized tests and the reality that teacher recommendations tend to favor well-represented student groups. If policies have not taken these phenomena into consideration, the result is likely to benefit well-represented student groups more than under-identified student groups.

Under-Identification in Algebra 1

With ample evidence touting the short and long-term benefits of 8^{th}-grade Algebra 1 enrollment, some states have explored ways to increase the number of students enrolled in 8^{th}-grade Algebra 1 (National Association of Gifted Children, n.d.). California, for example, initiated a movement in 2008 to make Algebra 1 the accountability benchmark test for 8^{th}-grade math. Under this “Algebra-For-All” policy, California intended to enroll all 8th-graders into Algebra 1 each year. Amidst this emphasis on increasing enrollment numbers, many students were not supported appropriately and performed much worse than they would have in a standard 8^{th}-grade math course. Some research shows that the negative impact of universal Algebra 1 enrollment persists at least through 10^{th} grade (Domina, et.al. 2015).

Additionally, school districts that enroll drastically different proportions of 8th-graders in Algebra 1 may teach Algebra 1 very differently (Domina, et.al. 2015). For example, Durham County Public Schools (DCPS) enrolled 14 percent of 8th-graders in Algebra 1 during the 2017-2018 school year while Wake County Public School System (WCPSS) enrolled 45 percent (NCERDC data, see Figure 17). Evidence would suggest that districts like WCPSS that enroll a relatively high proportion of students in Algebra 1 may not teach the course as rigorously as districts like DPS that enroll a relatively smaller proportion of students in Algebra 1. This curricular intensification has major impacts on students and teachers that ultimately influence student success in 8th-grade Algebra 1 and beyond. California’s Algebra-For-All model and the subsequent research on the policy’s impact demonstrate that states must think carefully about how to increase access to rigorous coursework.

The purpose of North Carolina’s recent state legislation, like SL 120, centers on ensuring that all students have access to appropriately rigorous coursework that will set them up for future success. Unlike California’s Algebra-For-All model, North Carolina’s SL 120 legislation does not intend to enroll all 8th-graders in Algebra 1. The premise behind SL 120 is that course placement rules based on objective measures, like standardized test scores, can identify students capable of completing rigorous coursework but whom discretionary systems might overlook (Dougherty, et.al. 2017). This paper explores how many students and which types of students SL 120 may impact when school districts implement it during the 2020-2021 school year.

IV. National Policy Landscape

History of Advanced Learning

To understand modern policy attempts at equitable course placement, it is helpful to review the history of gifted education and who gifted education has historically served. The history of gifted education and decades of related policies that have been enacted to promote equitable learning opportunities can offer contemporary policymakers insight into the potential impacts of proposed legislation. Although knowledge about gifted education has progressed in the last two centuries, traces of its beginning remain embedded in contemporary mindsets and practices. By recognizing those harmful remnants of the past, researchers and policymakers can limit the potential negative impacts of future legislation intended to promote equitable course access.

Gifted education dates to the mid-19th century when select districts began implementing systematic efforts to meet the unique learning needs of gifted students. As with most educational and professional opportunities of the time, gifted education was exclusively available to white males. Most of the schools specifically developed to cater to gifted students were built in wealthy, urban areas (Davidson Institute 2010). Students who were considered gifted most often earned that designation through demonstrated intellectual ability on traditional verbal assessments, like Intellectual Quotient (IQ) tests. This history offers insight into contemporary gifted education that remains stronger in urban than rural areas and continues to utilize verbal assessments for advanced course placement.

Research on intelligence flourished during the first half of the 20^{th} century, and it triggered government funding to support gifted education. In 1950, Congress enacted the National Science Foundation Act that increased federal investment in math and science research. Part of this research challenged the notion of intelligence as a single dimension. The field of gifted education continued to evolve as a result of academic findings and cultural shifts. The launch of Sputnik by the Soviet Union in 1957 fueled the U.S. federal government to increase its investment in human capital development, primarily through improving the quality of public schools. The National Defense Education Act passed the following year for the purpose of identifying gifted students. Then, in the 1970's, the Office of the Gifted and Talented was given official status through the U.S. Office of Education.

Gifted education programs were largely sparse and inconsistent from the late 1860's through the late 1960's, but the 1972 Marland report represented a turning point in the field. It was the first national report on gifted education and provided a widely used definition of gifted eligibility and services (National Association of Gifted Children 2013). In 1988, Congress passed the Jacob Javits Gifted and Talented Students Education Act as part of the Elementary and Secondary Education Act reauthorization. Although it has often been the subject of budget cuts, the Javits Act persistently funds gifted education even today (United States Department of Education 2019).

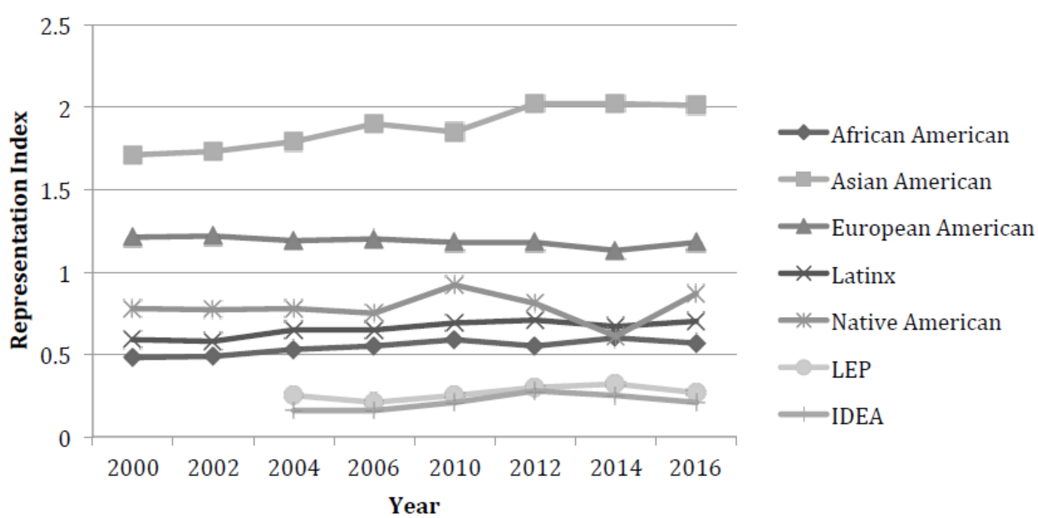
By the 1990's, the federal government and most state governments had some form of policy regarding gifted education. Today, 38 states mandate gifted education through rule, regulation, or statute (Davidson Gifted Database, n.d.). North Carolina, for example, has had legislation related to gifted education since 1961, but the 1996 enactment of Article 9B of the state's General Statutes solidified the state's commitment to providing gifted services. North Carolina's Article 9B provides guidance to school districts around Academically or Intellectually Gifted (AIG) students, codifies a formal definition of AIG, and requires school districts to submit three-year plans with specifics on how gifted learners will be identified and served. Details of gifted education mandates vary by state, and the presence of a state mandate does not guarantee equitable service delivery.

Persistent Issues in Advanced Learning

While gifted education has progressed from virtual anonymity in the 19th century to mainstream in the 21st century, key issues in the field persist today. The 2013 *McFadden v.*

Board of Education for Illinois School District U-46 case epitomizes one of the most prominent remaining issues in gifted education today: racial and ethnic disparities in access to advanced learning opportunities. The *McFadden* ruling affirmed that the Illinois school district violated the U.S. Constitution's Equal Protection Clause by creating a separate gifted program for Hispanic students. The *McFadden* ruling and the persistent racial and ethnic disparities in gifted education around the country today suggest that social biases of school staff and cultural biases of testing instruments used to identify gifted students contribute to segregated gifted classrooms. Figure 1 below depicts the historical racial and ethnic disparities in access to gifted education across the nation.

Figure 1: Gifted and Talented Representation Rates from 2000-2006



Source: "Who Gets Served in Gifted Education?" (2019) Scott Peters, et.al

Two contemporary state case studies highlight the potential of state policies to increase academic opportunities for marginalized students and ultimately narrow the achievement gap. A bellwether policy initiative in the state of South Carolina in 2000 focused on the need to identify more black children as gifted to meet an order from the Office for Civil Rights. Special training was provided to South Carolina teachers in math and science areas to increase educators' ability to identify students whose strengths were in nonverbal areas. A year after the program's implementation, ten to fourteen percent more low-income and black students were identified as gifted than the previous school year. The newly identified students performed at or above proficiency levels on standardized tests geared towards their area of strength (Swanson 2007). This example underscores the need for multiple testing measures in identifying students for advanced learning opportunities.

Similarly, a 2018 Illinois state bill offers a promising model for increasing equity in gifted programs and advanced courses. Decades of research has found that academic acceleration is an effective practice to enhance the academic and intellectual growth of advanced students (Illinois Accelerated Placement Act 2018). Yet, access to acceleration programs is unequal in Illinois and in many other states. Illinois's 2018 Acceleration Act mandates that all school districts in the state allow early kindergarten and first grade entry, whole grade acceleration, and single subject acceleration. There are several potential benefits to granting all students the opportunity to participate in advanced learning opportunities from a young age, including reduced achievement gaps and more proportional representation in advanced courses (Davidson Institute 2004).

The current national trend in gifted education involves local and state governments developing policy to address disparities in gifted access (Zirkel 2016). Yet, twelve states and the District of Columbia still do not require districts to provide gifted education services, and an additional seventeen plus the District of Columbia provide no funding for gifted identification or instruction (Davidson Gifted Database n.d.). Without state leadership, disparities in access to rigorous coursework will continue to widen the achievement gap and limit the potential of under-identified students. North Carolina's SL 120 represents the state's attempt to address the racial and ethnic disparities in gifted education through legislation. It intends to offer a viable model to ensuring that all students who qualify for advanced learning receive the appropriately rigorous instruction they need to thrive.

V. North Carolina Policy Landscape

North Carolina enacted gifted legislation beginning in the 1990's and has continued to introduce new policies to improve the delivery of education to all students (North Carolina Department of Public Instruction 2019). In June 2018, the NCGA passed House Bill 986, Session Law 2018-32 (SL 32) to make various changes to state education laws, and this legislation paved the way for SL 120 a year later. Part II of SL 32 encouraged school districts to offer advanced math courses in grades three and higher, with automatic enrollment for students who scored a five on the Math End-of-Course (EOC) or EOG tests. School districts were supposed to implement SL 32 beginning with the 2018-2019 school year.

Like the more recent SL 120, SL 32 only required districts to implement the legislation "when practicable." According to NCDPI, "when practicable" recognizes that some districts face "unique local contexts" that present challenges to implementing the legislation. NCDPI does not provide examples of "unique local contexts," but these presumably may include characteristics like Non-Metro school districts with small student populations. NCDPI encouraged districts to develop an implementation plan for the 2019-2020 school year if they could not execute the legislation during the 2018-2019 school year. NCDPI provided support for districts after the NCGA enacted SL 32 by hosting virtual sessions and uploading Frequently Asked Questions (FAQs) to the NCDPI website.

One of the central concerns about SL 32 and SL 120 has been the jump from standard Math 7 content to 8th-grade Algebra 1 content. In 2018, NCDPI encouraged school districts to "identify gaps in student knowledge and offer support to those students and teachers." NCDPI identified five skills that students would miss if they moved directly from standard Math 7 to 8th-grade Algebra 1: The Number System, Expressions and Equations, Geometry, Functions, and Statistics and Probability. According to NCDPI, districts should either compact curriculum for sixth and seventh grade students in standard math courses or provide instructional support to students who progressed from Math 7 to 8th-grade Algebra 1 to cover the topics listed above.

Another concern about SL 32 and SL 120 involves the availability of student test results. If districts do not receive student test scores before the subsequent school year begins, they would not be able to place students into the appropriate math course based on those test scores. In this case, NCDPI encouraged school districts to "continue to use the practices they have to recognize students in need of accelerated math opportunities." Despite these concerns, both SL 32 and subsequent SL 120 received overwhelming support from both political parties in the NCGA. State Representative Ed Hanes Jr. (D-Forsyth) even pronounced SL 32 "a big win for low-income students across the state."

In a 2018 webinar, NCDPI included a snapshot of 7th-grade students who may be impacted by SL 32. NCDPI reported that 22,414 students scored a five on the 7th-grade Math EOG test during the 2017-2018 school year (Supporting the Implementation of HB 986 2019). Of those students, just over 56 percent were already designated as gifted and consequently would have already been placed into 8th-grade Algebra 1 in most school districts (Ibid). NCDPI also reported that approximately 2,100 students would be directly impacted by SL 32. Those 2,100 students scored a five on the 7th-grade Math EOG test but were not placed into 8th-grade Algebra 1. This report confirms NCDPI's impact estimate and provides additional context about the characteristics of affected students.

About one year after the NCGA enacted SL 32, it enacted SL 120 as follow-up legislation. SL 120 presented the same goals as SL 32 but provided additional details for districts about implementation and reporting requirements. Yet, both of these statutes have at least one glaring issue: they fail to consider the critical difference between a "bright" student and a "gifted" student. Both a bright student and a gifted student would be appropriately challenged in an 8th-grade Algebra 1 class. The problem is that SL 32 and SL 120 mainly create opportunity for bright students to enter 8th-grade Algebra 1 by using test scores as a primary identification method. These bills do not emphasize innovative identification practices that could increase the likelihood that gifted students enter 8th-grade Algebra 1.

For the purposes of state legislation like SL 120, the distinction between bright and gifted is an important one. Increasing the weight of standardized test scores in the advanced course placement process primarily benefits bright students who typically perform well on these tests. Therefore, it is possible that gifted students, especially those from under-identified student groups, will continue to be overlooked despite SL 120 unless individual districts utilize supplemental identification practices. To be clear, most districts do use multiple strategies to assess whether a student should have access to more rigorous coursework (North Carolina Department of Public Instruction, n.d.). Yet, state legislation like SL 120 prioritizes test scores in the course placement process and consequently impacts the population of students enrolled in advanced courses.

VI. Implementation of SL 120

SL 120 supplements the way that school districts throughout North Carolina already identify students as gifted. Every three years, school districts submit detailed plans to the NCDPI that specify how gifted students' needs will be met by school staff. SL 120 provides additional guidance to districts on identifying students for advanced learning opportunities. Under SL 120, all students in grades three through five who score at the highest level on the Math EOG test shall be provided advanced learning opportunities in math during the subsequent school year (Modify Advanced Course Enrollment 2019). Similarly, all students in grades six and higher who score at the highest level on the Math EOG or EOC tests shall be enrolled in an advanced math course during the subsequent school year. Qualifying students cannot be removed from these opportunities without written consent from a guardian.

The NCGA distinguished between advanced learning opportunities and advanced courses because school districts across the state have differing models of gifted education delivery. Different models of gifted education delivery impact course placement. For example, the teacher of a gifted elementary-aged student might provide that student with more challenging problems during class or require the student to utilize multiple methods of solving problems. Yet, that student would have peers in class that have not been identified as gifted. In contrast, a gifted middle or high school-aged student would most likely take an Honors, Advanced Placement (AP), or International Baccalaureate (IB) course in which most other students in the class have been identified as gifted and are asked to perform tasks of the same difficulty level.

This report will specifically examine the impacts of SL 120 on students moving from 7^{th}- to 8th-grade in the 2016-2017 school year to the 2017-2018 school year. The standard course of study for math in North Carolina suggests that students should take Math 6 in 6^{th} grade, Math 7 in 7th-grade, Math 8 in 8th-grade, and NC Math 1 in 9^{th} grade. Students are required to complete four Math courses to graduate including NC Math 1 (Algebra 1), NC Math 2 (Geometry), and NC Math 3 (Algebra 2) (State Graduation Requirement Policy n.d.).

Figure 2: North Carolina Standard Math Course of Study

If you start with ...	7^{th} Grade	8^{th} Grade	9^{th} Grade	10^{th} Grade
Math 6	Math 7	Math 8	Math I (HS)	Math II (HS)
Math 6 Plus	Math 7 Plus	Math I (HS)	Math II (HS)	Math III (HS)
Compacted Math 6/7+	Math I (HS)	Math II (HS)	Math III (HS)	PreCalculus
Math 7 Plus	Math I (HS)	Math II (HS)	Math III (HS)	PreCalculus

Source: NCDPI State Graduation Requirement Policy

If students follow the standard course of study, they could take Pre-Calculus during their senior year as their required fourth math credit. Yet, this standard sequence does not encourage students to take a Calculus course. Students who take Calculus in high school are more likely to seek post-graduate education and more likely to choose a STEM major (Dougherty, et.al. 2017). To position students for taking Calculus during their senior year of high school, school districts must offer Algebra 1 to 8th-graders. Abundant evidence suggests that students who take Algebra 1 before entering high school are more likely to enroll in advanced Math and science courses during high school and, consequently, reap the long-term benefits of doing so (Dougherty, et.al. 2017; United States Department of Education 2018). In theory, SL 120 positions more students to take Algebra 1 prior to high school.

VII. Data

The North Carolina Education Research Data Center (NCERDC) makes data collected by NCDPI available to researchers, and it provided several data sets for this report. The data sets for this report included student-level Math EOG scores and course membership information for the 2016-2017 and 2017-2018 school years. The 2016-2017 data set included the unique identifier number of each student along with each student's demographic information, school code, and EOG test scores. The 2017-2018 data set also included the unique identifier number of each student along with each student's demographic information, school code, and course membership records.

Both data sets were manually limited to include only students in traditional public schools across North Carolina. Therefore, charter schools and the students who attended those charter schools during the relevant school years were excluded from this analysis. Since both data sets contained unique identifier numbers for each student, it was possible to merge the data sets to track students from 7^{th} to 8^{th} grade during the years of interest.

VIII. Methodology of Analysis

This report will estimate the number of students and the characteristics of students who may be granted access to Algebra 1 as a direct result of SL 120 when it is implemented in December 2021. This report will also analyze the demographic and geographic characteristics of those students to highlight relevant patterns in advanced course enrollment throughout the state. The following section outlines the methodology used to answer the policy question.

Step 1: Match students across 7^{th} and 8^{th} grade by merging data sets

The 2016-2017 data set was narrowed to reflect 7^{th}-grade students and their Math EOG proficiency level. Similarly, the 2017-2018 data set was narrowed to reflect 8^{th}-grade students and their math course enrollment for that year. Then, the 2016-2017 data set was merged with the 2017-2018 data set by unique identifier number. Student demographic variables like gender, race and ethnicity, and low-income status were also merged to facilitate analysis of demographic trends in course placement. District codes were also merged to allow for analysis of geographic trends in course placement.

The merged data set listed students by their unique identifier number with their 7th-grade Math EOG test score and their 8th-grade math course enrollment. Approximately 19,000 students left the state's public school system or repeated 7th grade from the 2016-2017 to 2017-2018 school years. Nearly 100,000 public-school students had a 7th-grade Math EOG test score and an 8th-grade math course placement during the relevant years. Figure 3 below presents example data with the two key variables: Math EOG level and math course placement. Five is currently the highest proficiency level on the Math EOG test.

Figure 3: Example Merged Data

Student Identifier	**2016-2017**	**2017-2018**
	7th-grade Math EOG Proficiency Level	8th-grade Math Course
1	5	Math 8
2	5	Algebra 1
3	2	Algebra 1
4	3	Math 8

Then, the data was narrowed to reflect standard and advanced 8th-grade math courses using course titles from the 2017-2018 school year. This research isolated 8th-grade students who progressed from 7th to 8th grade on their first attempt, not those students who repeated 8th grade. To eliminate students who repeated 8th grade, any math courses that represented credit recovery options were not included in the analysis. This research included various course titles for Math Grade 8 and Algebra 1, listed in Figure 4 below. Although school districts can use a variety of different course titles, it was possible to capture the vast majority of 8thgraders in public schools through the most common course titles.

Figure 4: Math Course Titles for 8th-graders, 2017-2018 School Year

Math 8	Algebra 1
MATH GRADE 8	ALGEBRA 1
MATH 8	ALGEBRA 1 (HS CRED)
MATH 8TH	ALGEBRA 1 (HS CREDIT)
	ALGEBRA 1 (MS FOR HS CREDIT)
	ALGEBRA 1 (MS/HS CREDIT)
	ALGEBRA 1- HS CREDIT
	ALGEBRA 1 8TH FOR HS CREDIT
	ALGEBRA 1 HS CREDIT
	ALGEBRA 1 MS FOR HS CREDIT
	ALGEBRA 1 YR HS

This selection produced a total population of nearly 200,000 8th-grade students and included all 115 school districts. Students who were not included in this analysis were likely enrolled in a Math 8 or Algebra 1 course with a title other than the ones listed in Figure 4. The course titles listed in Figure 4 were the only ones that had a significant number of students and clearly indicated which course they represented. It is also possible that some students advanced into courses other than Math 8 or Algebra 1. This analysis may produce a slightly more conservative estimate of the number of students impacted by SL 120 since some students may have been missed in this step.

SL 120 only requires districts to implement the legislation “when practicable,” so it is possible that small, rural districts may not implement SL 120 right away. Ten districts did not offer Algebra 1 to 8th graders in physical classrooms during the 2017-2018 school year. Those districts included Alleghany County Schools, Ashe County Schools, Camden County Schools, Clay County Schools, Davidson County Schools, Greene County Schools, Weldon City Schools, Hyde County Schools, Montgomery County Schools, and Northampton County Schools. These districts may have offered Algebra 1 to students via North Carolina Virtual Schools (NCVPS) or another virtual platform. Even under SL 120, these districts will not be required to offer Algebra 1 to 8th graders in district classrooms.

Step 2: Isolate population of interest

Using the merged data set described above, students were divided into four groups based on whether they earned the highest proficiency level on the Math EOG test in 7th grade and whether they were enrolled in Algebra 1 in their 8th-grade year. Figure 5 represents the same student outcomes presented in Figure 3 but with binary indicator variables. In Figure 5, all four categories are represented by binary variables for each possible outcome. A number one in the 7th-grade column means that a student scored the highest proficiency level on the Math EOG test. A zero means they did not. A number one in the 8th-grade column means that a student was enrolled in Algebra 1 that year. A zero means they were not.

For example, Student 1 and Student 2 earned the highest score on the 7th-grade Math EOG test, yet only Student 2 was enrolled in Algebra 1 in 8th grade. This research seeks, primarily, to identify the number of students who, like Student 1, earned the highest score on the 7th-grade Math EOG test but were not placed into Algebra 1 during the subsequent school year. These students will be referred to as "eligible" because, under SL 120, they would be eligible for placement in 8th-grade Algebra 1 due to their qualifying 7th-grade Math EOG test score. This research is also interested in students, like Student 4, who did not earn the qualifying test score according to SL 120 but were still placed into 8th-grade Algebra 1. These students will be referred to as "ineligible" since SL 120 would not grant them direct access into 8th-grade Algebra 1. Although Figure 5 presents the four possible student outcomes, this research only focuses on two outcomes: eligible and ineligible students according to the categorization described above.

Figure 5: Example SL 120 Target Population

Student Identifier	**2016-2017**	**2017-2018**
	7th-grade Math EOG Proficiency Level	8th-grade Math Course
1	1	0
2	1	1
3	0	0
4	0	1

Step 3: Disaggregate population of interest by demographic characteristics

This research seeks to identify any relevant patterns among the demographic characteristics of eligible and ineligible students identified from the previous step. First, the data was narrowed to include only those students who were eligible for Algebra 1 under the requirements of SL 120. Then, characteristics of those eligible students including gender, race and ethnicity, and low-income status were summarized. Gender and race and ethnicity are represented as variables in the data set directly. Low-income status is represented by Economically Disadvantaged Status (EDS). Figure 6 presents sample data with relevant variables that were used to highlight patterns in student demographic characteristics.

Figure 6: Example Characteristics of Eligible Students

Student Identifier	**2016-2017**	**2017-2018**	**Student Characteristics**		
	7th-grade Math EOG Score	8th-grade Math Course	Gender	Race/Ethnicity	EDS
1	1	0	M	African American	N
2	1	0	F	White	Y
3	1	0	M	Hispanic	Y
4	1	0	F	African American	Y

Step 4: Disaggregate population of interest by location

Since the data included the school district in which each student was enrolled during the 2016-2017 and 2017-2018 school years, relevant patterns in advanced course placement can be assessed by geographical region type and district size. This research utilized the United States Department of Agriculture's (USDA) rural urban continuum codes to group districts into numeric categories that represent the level of urbanization or rurality of that district. All 115 North Carolina school districts were divided into categories 1 through 9 according to the USDA's most recent county-level classifications. After sorting each district into categories, the number of students in each code was summarized by 7^{th}-grade Math EOG test score and 8^{th}-grade math course enrollment.

Figure 7: Description of Continuum Codes

1	Metro	Counties in metro areas of 1 million population or more
2	Metro	Counties in metro areas of 250,000 to 1 million population
3	Metro	Counties in metro areas of fewer than 250,000 population
4	Non-Metro	Urban population of 20,000 or more, adjacent to a metro area
5	Non-Metro	Urban population of 20,000 or more, not adjacent to a metro area
6	Non-Metro	Urban population of 2,500 to 19,999, adjacent to a metro area
7	Non-Metro	Urban population of 2,500 to 19,999, not adjacent to a metro area
8	Non-Metro	Completely rural or less than 2,500 urban population, adjacent to a metro area
9	Non-Metro	Completely rural or less than 2,500 urban population, not adjacent to a metro area

Source: USDA Rural Urban Continuum Codes (2013)

IX. Findings

In this paper, the word "eligible" has described students who scored a five on the 7th-grade Math EOG test and were therefore eligible under SL 120 to be enrolled in 8th-grade Algebra 1. Additionally, "ineligible" has been used to describe those students who did not score a five on the 7th-grade Math EOG test, regardless of their 8th-grade course placement, because these students would not gain access to 8th-grade Algebra 1 as a direct result of SL 120. This language offers a simplified way of referring to each student group in the simulation. Yet, it is important to note that EOG test scores alone do not usually determine eligibility for advanced coursework. However, since this paper intends to measure the direct impacts of SL 120, which primarily utilizes student test scores for course placement, a student's eligibility for services under SL 120 is determined solely by students' 7th-grade Math EOG proficiency level.

Students Directly Impacted by SL 120

Of the nearly 100,000 students remaining at the last steps of the simulation, only two percent would be considered eligible under SL 120 for 8th-grade Algebra 1 enrollment based on their 7th-grade Math EOG test performance. Twelve percent of students in the simulation did not receive the qualifying score on the 7th-grade Math EOG test but were still placed into Algebra 1 during the subsequent school year. SL 120 will not directly affect these ineligible students because they were likely identified through methods other than test performance alone or through testing earlier in their academic careers. These initial numbers estimate that SL 120 will have a relatively small impact on the state's public-school students; just 2,049 students are estimated to gain access to 8th-grade Algebra 1 as a direct result of the legislation. Figure 8 shows the percent of students who appeared eligible and ineligible for 8th-grade Algebra 1 enrollment during the 2017-2018 school year if SL 120 had been in place.

Figure 8: Percent of Eligible and Ineligible Students Under SL 120

Total Population in Sample	
Eligible	**Ineligible**
2%	12%

Based on this simulation from the 2016 to 2018 school years, it is likely that the actual impacts of SL 120 will be similar in 2021. Advocates of SL 120 could argue that SL 120 only impacts two percent of students because many school districts already employ effective identification practices that do not systematically under-identify eligible students. Yet, the overall trends in advanced course placement clearly show inequities between student groups that must be addressed by the State to ensure a quality education for all students.

Further analysis of the estimated 2,049 affected students and the overall trends in advanced math placement highlight the fact that SL 120 mostly helps already well-represented student groups rather than under-identified student groups. Figure 9 below summarizes the characteristics of the 2,049 eligible students from the simulation who would be granted access to 8th-grade Algebra 1 as a direct result of SL 120.

Figure 9: Characteristics of Eligible Students Under SL 120

Race/Ethnicity	
Asian	4%
Black	7%
Hispanic	13%
Other	5%
White	71%
Economically Disadvantaged	
Yes	34%
No	66%
Gender	
Male	54%
Female	46%
Region Type	
Metro	70%
Non-Metro	30%

Of the 2,049 students who scored a five on the Math EOG test in 7th-grade but were not placed into Algebra 1 in 8th-grade, most do not belong to the under-identified groups that SL 120 intended to promote. To understand why SL 120 helps these particular student groups, it is helpful to examine general trends in Math EOG test scores and Algebra 1 placement among each major group in the simulation.

Two general trends can be learned from this simulation: (1) Students in under-identified groups score a five on the Math EOG test less frequently, on average, than students in well-represented groups; and (2) Students in well-represented groups are more likely, on average, to be placed into advanced courses even without qualifying test scores. These trends hold for nearly all of the under-identified student groups in the simulation including race and ethnicity, low-income status, and regional classification.

The differential test score patterns between under-identified and well-represented student groups highlight the weakness in policies like SL 120. While SL 120 aims to increase the number of under-identified students in advanced courses, it mainly helps students in well-represented groups by prioritizing test performance as the primary determinant of advanced course placement. Additionally, the legislation does not address the fact that ineligible students who were granted 8th-grade Algebra 1 access despite a lack of qualifying test scores mostly represent well-identified student groups. These findings suggest that North Carolina must continue searching for pathways to a more equitable learning environment that provides adequately rigorous instruction for all students.

Findings Related to Students with Economically Disadvantaged Status (EDS)

EDS and Non-EDS students in the simulation represented comparably sized groups as 48,692 students had EDS and 46,361 students had Non-EDS. EDS students are typically under-identified in advanced courses for several potential reasons. This simulation indicates that students with EDS, on average, score a five less frequently than students without EDS. Additionally, more than double the number of Non-EDS students compared to EDS students were placed into Algebra 1 despite not earning a five on the Math EOG test in the previous year. Figure 10 indicates that about 27 percent of Non-EDS students and 7 percent of EDS students scored a five on the Math EOG during the 2017-2018 school year.

Figure 10: Comparison of EDS and Non-EDS Student Scoring and Placement

EDS	Total in Sample	Scored 5 on Math EOG	Placed in Algebra 1
No	46,362	12,341	18,569
Yes	48,700	3,501	6,529

EDS and Non-EDS student populations are relatively similar in size yet the percentage of ineligible students in each group enrolled in Algebra 1 is radically different. Therefore, it is likely that other factors besides EOG test scores impact the disparate placement of EDS and Non-EDS students into 8th-grade Algebra 1. Figure 11 shows that double the percentage of Non-EDS students get placed into 8th-grade Algebra 1 than EDS students despite not earning the qualifying test score under SL 120. These numbers suggest that other factors, possibly alternative testing mechanisms or teacher recommendations, influence the likelihood that certain students are granted access to advanced math coursework.

Figure 11: Comparison of EDS and Non-EDS Student Eligibility

Student Low-Income Status	Eligible	Ineligible
EDS	1%	8%
Non-EDS	3%	16%

Findings Related to Student Race and Ethnicity

As with low-income status, students with under-identified racial and ethnic identity may be less affected by SL 120 than their well-represented counterparts. The "Other" racial category in this analysis includes students who identify as Native Hawaiian, Other Pacific Islander, Alaska Native, or American Indian. Since these categories include relatively small numbers of students, they have been grouped into a single category for analysis purposes. Yet, the point of interest in Figure 12 below is the difference between average scoring patterns of well-represented and under-identified racial and ethnic groups.

Under-identified racial groups like black and Hispanic students score a five on the Math EOG test less frequently, on average, than their well-represented counterparts like white and Asian students. Several potential reasons underlie these racial disparities in EOG test performance, including the cultural bias inherent in existing standardized tests and the correlation between students of color and low-income status. Figure 12 highlights the central flaw in policies like SL 120 that aim to increase the proportion of under-identified students in advanced math courses: black and Hispanic students score a five much less frequently than their well-represented counterparts and consequently would not be directly impacted as much by legislation like SL 120.

Figure 12: Comparison of Student Scoring and Placement by Race and Ethnicity

Race/Ethnicity	Percent of Students Who Scored a 5
White	24%
Black	5%
Hispanic	10%
Asian	42%
Other	13%

Figure 13: Comparison of Student Eligibility by Race and Ethnicity

Race/Ethnicity	Eligible	Ineligible
White	13%	18%
Black	11%	10%
Hispanic	17%	11%
Asian	8%	26%
Other	16%	12%

On the other hand, even those well-represented student groups without qualifying test scores get placed into 8th-grade Algebra 1 at higher average rates than their under-identified counterparts. It is possible that alternative identification practices, including teacher recommendations, generally help well-represented students more than under-identified students because of inherent staff biases about student ability.

Findings Related to Student Gender

Male and female students in this simulation were represented by comparatively even numbers with 48,722 male students and 46,331 female students. Some research posits that state policies like SL 120 increase emphasis on non-discretionary placement practices and often help female students more than male students (Ellison and Swanson 2009). In this research, male and female students earned a five on the Math EOG test and were placed into 8th-grade Algebra 1 at similar rates. Figure 14 highlights one key difference between male and female students: male students get placed into 8th-grade Algebra 1 at higher rates than female students when they do not earn the qualifying test score under SL 120. This pattern is similar for other student characteristics also and may be a result of staff biases about student ability. It is possible that some teachers may believe that male students are more capable of succeeding in higher level math courses despite not earning a qualifying score.

Figure 14: Comparison of Student Eligibility by Gender

Gender	Eligible	Ineligible
Male	13%	18%
Female	11%	10%

Findings Related to Metro and Non-Metro Districts

On average, Metro districts "miss" less eligible students in Algebra 1 enrollment. In this research, Metro districts averaged 12 percent eligible students who were not placed into Algebra 1 while Non-Metro districts averaged 27 percent. Non-Metro school districts tend to have less resources including alternative testing opportunities, guidance counselors, etc. devoted to gifted identification practices than Metro school districts, which may impact course placement practices in Non-Metro districts.

This analysis of geographic differences in advanced course placement also highlighted trends in ineligible student placement. On average, students who did not score a five on the Math EOG test in 7th-grade were more likely to be placed into Algebra 1 in 8th grade if they were enrolled in Metro school districts compared with Non-Metro school districts. This research included two of the largest Metro school districts in North Carolina: Charlotte-Mecklenburg Schools (CMS) and Wake County Public School System (WCPSS). These larger school districts likely have additional resources to support more robust course placement practices than smaller, rural districts. Therefore, it is possible that these districts miss less eligible students.

As a result, it is feasible that SL 120 will have a lesser proportional impact on larger, urban districts. However, this impact is still worth noting; just three percent of WCPSS's eligible student population, for example, translates into hundreds more students gaining access to the rigorous coursework they deserve. On the other hand, large metro districts enroll certain ineligible student groups in advanced courses at higher rates. While SL 120 may not significantly increase the proportion of under-identified students in advanced courses, it may at least draw attention to the alternative pathways that enable ineligible, well-represented students to enroll in advanced courses at higher rates.

Figure 15 below depicts the percent of students in each continuum code who scored a five on the Math EOG test but were not placed into 8th-grade Algebra 1. These percentages were based on the average of students in all of the districts within each continuum code. For example, continuum code seven includes just two school districts: Richmond County Schools

(RCS) and Watauga County Schools (WCS). An average 59 percent of students in RCS and WCS scored a five on the Math EOG test during 2016-2017 but were not placed into 8th-grade Algebra 1 during 2017-2018. Figure 16 depicts the percent of students in each continuum code category who did not score a five on the Math EOG but were still placed into 8th-grade Algebra 1. For example, an average 21 percent of students in RCS and WCS did not score a five on the Math EOG during 2016-2017 but were placed into 8th-grade Algebra 1 during 2017-2018.

In general, this simulation found that small, Non-Metro school districts tend to enroll proportionally less students in 8th-grade Algebra 1 than large, Metro school districts regardless of test performance. Yet, continuum code eight bucks this trend. Continuum code eight includes six school districts that range in size from just thirty 8th-grade students to 4,226 8th-grade students. Guilford County Schools (GCS) is by far the largest school district in continuum code eight and may be responsible for the low rate of "missing" eligible students displayed in Figure 15 and the relatively high rate of ineligible students in 8th-grade Algebra 1 depicted in Figure 16. GCS is a majority-minority school district that implements multiple methods of identifying students for advanced learning opportunities, with a particular emphasis on under-identified student groups (Guilford County Schools Academically Gifted website, n.d.). Not only do these practices appear to reduce the number of missing eligible students in 8th-grade Algebra 1, but they also increase the number of ineligible students enrolled in 8th-grade Algebra 1.

Figure 15: Percent of Eligible Students Under SL 120 by District Continuum Code

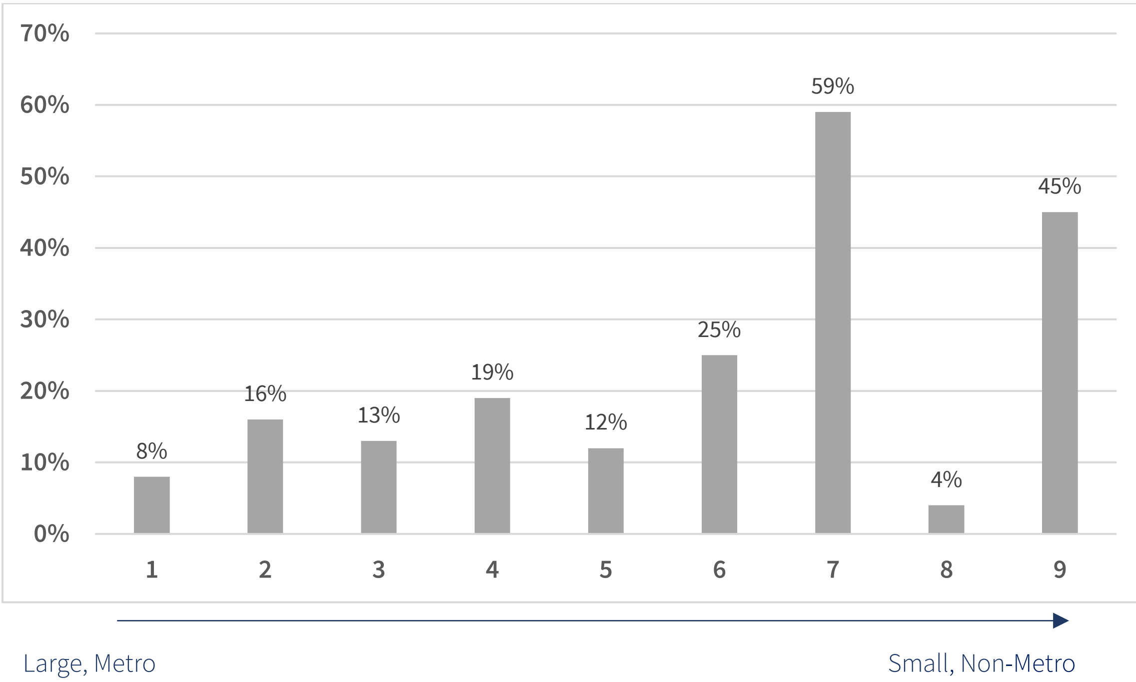
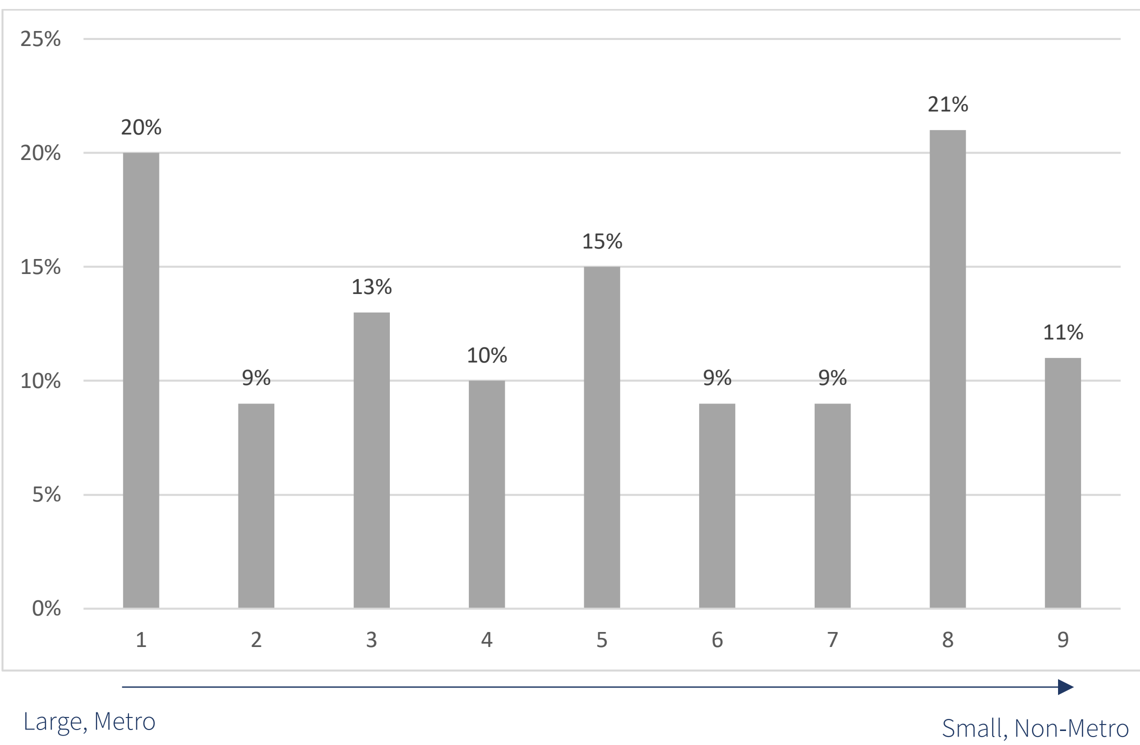


Figure 16: Percent of Ineligible Students Under SL 120 by District Continuum Code



When GCS was removed from continuum code eight, the continuum code averages changed drastically. Without GCS, the other school districts in continuum code eight averaged 18 percent eligible students missed (up from 4 percent) and 11 percent ineligible students enrolled in 8th-grade Algebra 1 (down from 21 percent). This example offers a reminder that individual districts within a continuum code may present very different data. This example also emphasizes the fact that some North Carolina school districts, like GCS already implement some practices to increase the likelihood that all students get placed into appropriately rigorous math courses, and therefore may not be impacted as much by SL 120.

Since GCS, for example, only missed four percent of eligible students during the 2016 to 2018 school years, SL 120 is likely to have a smaller proportional impact on GCS compared to other districts that miss a much larger percentage of eligible students. This example also highlights the weakness in SL 120; increased reliance on high test performance likely impacts a relatively small number of already well-represented students and will have a proportionally smaller impact on school districts that already implement alternative identification practices. Examining the percentage of 8th graders enrolled in Algebra 1 in each school district provides insight into which districts may be most impacted by legislation like SL 120.

For example, WCPSS enrolled 45 percent of 8th graders in Algebra 1 during the 2017-2018 school year while Durham County Public Schools (DCPS) only enrolled 14 percent. It is likely that SL 120 will have a larger proportional impact on school districts like DCPS that enroll a smaller percentage of 8th graders in Algebra 1 since more students may be missed in those districts. Yet, the percentage of 8th graders enrolled in Algebra 1 may not be as important as the characteristics of those students since the overall number of impacted students appears relatively small.

Figure 17: Percent of 8th-graders enrolled in Algebra 1

School District	Percent of 8th-Graders in Algebra 1
Durham County Schools	14%
Cumberland County Schools	20%
Buncombe County Schools	28%
Forsyth County Schools	32%
Charlotte-Mecklenburg County Schools	33%
Guilford County Schools	35%
Wake County Public School System	45%

Source: NCDPI AIG Child Count Data, 2016-2017

The intention of state policies regarding gifted identification should be to ensure that all students have access to appropriately rigorous coursework, not simply to increase the number of students in advanced math courses. In addition, state policies must ensure that the characteristics of students who are in advanced coursework are similar to the characteristics of students in the general student body. In other words, massive disparities in advanced math course enrollment between student groups should not persist for decades as they have in North Carolina. Based on this simulation, it seems unlikely that SL 120 will change the historical under-identification of certain student groups to advanced courses like 8^{th}-grade Algebra 1.

X. Conclusion

Research widely acknowledges that low-income students, black students, Hispanic students, and students from Non-Metro districts are consistently under-identified in gifted education across the U.S. and have been for many years (Ford 1998; Peters, et.al. 2019). This analysis of North Carolina's recent gifted legislation shows that state policies tying achievement testing to advanced math course placement will likely increase the number of already well-represented student groups more than under-identified student groups in those courses. SL 120 will likely produce greater benefits for student groups already well-represented in advanced courses than under-identified student groups for two key reasons.

First, comparatively well-represented student groups like white and Asian students, Non-EDS students, and students enrolled in Metro school districts typically perform better than their under-identified counterparts on standardized tests like the EOG and EOC. In this simulation, for example, approximately 90 percent of students in continuum code nine did not score a five on the Math EOG test during the 2017-2018 school year compared with less than 80 percent of students in continuum code one. Therefore, a policy like SL 120 that ties high test performance to placement in advanced courses is inherently more likely to benefit well-represented students who traditionally perform better on standardized tests.

Second, SL 120 does little to address the alternative pathways into advanced coursework that often privilege well-represented students. Biases of school staff about student ability based on demographics will continue to benefit well-represented students and hold back under-identified students. Similarly, guardians will continue to advocate for their children to be placed into advanced courses regardless of ability, and guardians of well-represented students tend to be more successful in these attempts (Hammond 2001). These examples provide insight into why more ineligible students who belong to well-represented groups get placed into Algebra 1 than their ineligible, under-identified counterparts.

Overall, this simulation estimates that SL 120 will produce a slight increase in the number of students granted access to Algebra 1 in 8th-grade. However, this report finds that the population SL 120 intended to benefit, i.e. under-identified student groups, will not benefit as much as well-represented student groups. Therefore, it is integral that NCDPI and school districts continue searching for methods of ensuring that students have access to appropriately rigorous coursework. Action 2 of the NCDPI's recent Call to Action plan relates directly to the State's recent legislation, like SL 120 (NCDPI Advanced Learning and Gifted Education, 2018).

The NCDPI's Call to Action plan is part of the NC2030 Campaign started by former State Superintendent Mark Johnson in 2018. The Call to Action issue brief summarizes the State's six-step action plan to "realize equity and excellence in gifted education." In the Call to Action brief, Action 2 calls for use of equitable identification practices to mitigate barriers in access to gifted education. Furthermore, Action 2 suggests that districts implement universal screening and referral practices. The Call to Action brief highlights the fact that the NCDPI recognizes the inequity of North Carolina's gifted education and advanced course enrollment. Yet, the NCDPI's recommendations in the Call to Action brief are not reflected in the State's recent AIG legislation. For example, neither SL 32 nor SL 120 mention any screening practices other than achievement tests.

Although recent state legislation falls short in many areas, especially identification practices, it does move the needle forward on reporting requirements. SL 120 requires the NCDPI to report annually to the Joint Legislative Education Oversight Committee on the number and demographics of students who were eligible for advanced math courses and were not placed into those courses. Under this mandate, school districts will have to track which students are being granted access to advanced math courses and report that data to the NCDPI. Most districts already tracked disaggregated AIG and advanced course data, but SL 120 will likely increase districts' attention to the disparities in access to these learning opportunities.

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Appendices

Appendix 1: NCERDC Data Summary

Data Summary 2017-2018 School Year	
32,323,695	Total Students in All NC Schools
2,526,307	8th Graders in NC Public Schools
203,238	8th Graders in Selected Math Courses
15,842	Students Who Scored 5 on Math EOG
79,220	Students Who Did Not Score 5 on Math EOG
95,062	**Students Analyzed in Simulation**
2,049	**Eligible Students Impacted by SL 120**
**Total Students includes charter schools; all other values exclude charter schools*	

Appendix 2: Relevant Variables in NCERDC Data

NCERDC Data Sets	
pc_audit 2016-2017	**crs_memb 2017-2018**
mastid	mastid
grade	grade
ethnic	ethnic
lea	lea
schlcode	schlcode
sex	sex
eds	eds
frl	coursecode
pc_ma_level	coursetitle
-	collection_code
-	section

Appendix 3: Number of Students in Selected Math Courses 2017-2018

Number of Students in Selected Math Courses	
MATH 8	7,039
MATH 8TH	2,167
MATH GRADE 8	142,603
Standard Total	151,809
NC MATH 1	29,088
NC MATH 1 (HS CRED)	5,746
NC MATH 1 (HS CREDIT)	5,542
NC MATH 1 (MS FOR HS CREDIT)	5,210
NC MATH 1 (MS/HS CREDIT)	4,583
NC MATH 1- HS CREDIT	626
NC MATH 1 8TH FOR HS CREDIT	634
Advanced Total	51,429
Total Student Count in Simulation	**203,238**

Appendix 4: USDA Urban Rural Continuum Code Classifications

USDA Urban Rural Continuum Codes 2013			
County Name	**Population**	**Code**	**Description**
Alamance County	151,131	3	Metro - Counties in metro areas of fewer than 250,000 population
Alexander County	37,198	2	Metro - Counties in metro areas of 250,000 to 1 million population
Alleghany County	11,155	9	Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area
Anson County	26,948	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Ashe County	27,281	7	Nonmetro - Urban population of 2,500 to 19,999, not adjacent to a metro area
Avery County	17,797	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Beaufort County	47,759	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Bertie County	21,282	7	Nonmetro - Urban population of 2,500 to 19,999, not adjacent to a metro area
Bladen County	35,190	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Brunswick County	107,431	2	Metro - Counties in metro areas of 250,000 to 1 million population
Buncombe County	238,318	2	Metro - Counties in metro areas of 250,000 to 1 million population
Burke County	90,912	2	Metro - Counties in metro areas of 250,000 to 1 million population
Cabarrus County	178,011	1	Metro - Counties in metro areas of 1 million population or more
Caldwell County	83,029	2	Metro - Counties in metro areas of 250,000 to 1 million population
Camden County	9,980	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Carteret County	66,469	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Caswell County	23,719	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Catawba County	154,358	2	Metro - Counties in metro areas of 250,000 to 1 million population
Chatham County	63,505	2	Metro - Counties in metro areas of 250,000 to 1 million population
Cherokee County	27,444	9	Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area
Chowan County	14,793	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Clay County	10,587	9	Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area
Cleveland County	98,078	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Columbus County	58,098	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Craven County	103,505	3	Metro - Counties in metro areas of fewer than 250,000 population
Cumberland County	319,431	2	Metro - Counties in metro areas of 250,000 to 1 million population
Currituck County	23,547	1	Metro - Counties in metro areas of 1 million population or more
Dare County	33,920	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Davidson County	162,878	2	Metro - Counties in metro areas of 250,000 to 1 million population
Davie County	41,240	2	Metro - Counties in metro areas of 250,000 to 1 million population
Duplin County	58,505	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Durham County	267,587	2	Metro - Counties in metro areas of 250,000 to 1 million population
Edgecombe County	56,552	3	Metro - Counties in metro areas of fewer than 250,000 population
Forsyth County	350,670	2	Metro - Counties in metro areas of 250,000 to 1 million population
Franklin County	60,619	1	Metro - Counties in metro areas of 1 million population or more
Gaston County	206,086	1	Metro - Counties in metro areas of 1 million population or more
Gates County	12,197	1	Metro - Counties in metro areas of 1 million population or more
Graham County	8,861	9	Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area
Granville County	59,916	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Greene County	21,362	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Guilford County	488,406	2	Metro - Counties in metro areas of 250,000 to 1 million population

Halifax County	54,691	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Harnett County	114,678	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Haywood County	59,036	2	Metro - Counties in metro areas of 250,000 to 1 million population
Henderson County	106,740	2	Metro - Counties in metro areas of 250,000 to 1 million population
Hertford County	24,669	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Hoke County	46,952	2	Metro - Counties in metro areas of 250,000 to 1 million population
Hyde County	5,810	9	Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area
Iredell County	159,437	1	Metro - Counties in metro areas of 1 million population or more
Jackson County	40,271	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Johnston County	168,878	1	Metro - Counties in metro areas of 1 million population or more
Jones County	10,153	3	Metro - Counties in metro areas of fewer than 250,000 population
Lee County	57,866	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Lenoir County	59,495	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Lincoln County	78,265	1	Metro - Counties in metro areas of 1 million population or more
McDowell County	44,996	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Macon County	33,922	7	Nonmetro - Urban population of 2,500 to 19,999, not adjacent to a metro area
Madison County	20,764	2	Metro - Counties in metro areas of 250,000 to 1 million population
Martin County	24,505	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Mecklenburg County	919,628	1	Metro - Counties in metro areas of 1 million population or more
Mitchell County	15,579	7	Nonmetro - Urban population of 2,500 to 19,999, not adjacent to a metro area
Montgomery County	27,798	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Moore County	88,247	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Nash County	95,840	3	Metro - Counties in metro areas of fewer than 250,000 population
New Hanover County	202,667	2	Metro - Counties in metro areas of 250,000 to 1 million population
Northampton County	22,099	9	Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area
Onslow County	177,772	3	Metro - Counties in metro areas of fewer than 250,000 population
Orange County	133,801	2	Metro - Counties in metro areas of 250,000 to 1 million population
Pamlico County	13,144	3	Metro - Counties in metro areas of fewer than 250,000 population
Pasquotank County	40,661	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Pender County	52,217	2	Metro - Counties in metro areas of 250,000 to 1 million population
Perquimans County	13,453	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Person County	39,464	2	Metro - Counties in metro areas of 250,000 to 1 million population
Pitt County	168,148	3	Metro - Counties in metro areas of fewer than 250,000 population
Polk County	20,510	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Randolph County	141,752	2	Metro - Counties in metro areas of 250,000 to 1 million population
Richmond County	46,639	5	Nonmetro - Urban population of 20,000 or more, not adjacent to a metro area
Robeson County	134,168	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Rockingham County	93,643	2	Metro - Counties in metro areas of 250,000 to 1 million population
Rowan County	138,428	1	Metro - Counties in metro areas of 1 million population or more
Rutherford County	67,810	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Sampson County	63,431	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Scotland County	36,157	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area

Stanly County	60,585	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Stokes County	47,401	2	Metro - Counties in metro areas of 250,000 to 1 million population
Surry County	73,673	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Swain County	13,981	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Transylvania County	33,090	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Tyrrell County	4,407	9	Nonmetro - Completely rural or less than 2,500 urban population, not adjacent to a metro area
Union County	201,292	1	Metro - Counties in metro areas of 1 million population or more
Vance County	45,422	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Wake County	900,993	1	Metro - Counties in metro areas of 1 million population or more
Warren County	20,972	8	Nonmetro - Completely rural or less than 2,500 urban population, adjacent to a metro area
Washington County	13,228	7	Nonmetro - Urban population of 2,500 to 19,999, not adjacent to a metro area
Watauga County	51,079	5	Nonmetro - Urban population of 20,000 or more, not adjacent to a metro area
Wayne County	122,623	3	Metro - Counties in metro areas of fewer than 250,000 population
Wilkes County	69,340	6	Nonmetro - Urban population of 2,500 to 19,999, adjacent to a metro area
Wilson County	81,234	4	Nonmetro - Urban population of 20,000 or more, adjacent to a metro area
Yadkin County	38,406	2	Metro - Counties in metro areas of 250,000 to 1 million population

Appendix 5: Guilford County Public Schools AIG Plan 2019-2022

Deena A. Hayes | Chairperson, Board of Education
Sharon L. Contreras, Ph.D. | Superintendent

GUILFORD County Schools
SOAR TO GREATNESS

GCS Academically and Intellectually Gifted Plan 2019-2022

The GCS AG Plan is undergoing revisions as part of a three-year plan development cycle. The draft AIG Plan will be posted for parent and community feedback. District staff will bring the proposed 2019-2022 AIG Plan to the Board of Education for approval in May and submit to the Department of Public Instruction (DPI) by July 15, 2019.

The principle areas of focus of the 2019-2022 AIG Plan are:

1. **More Inclusive Identification**
   - Use of local norms with the administration of the Cognitive Abilities Test 8 (CogAT8)
   - Administration of the Cognitive Abilities Test 8 (CogAT8) in the spring of 2nd grade
   - Use of BOG scores as an additional AG identification measure
   - Implementation of a rubric for use in identification of students from underrepresented populations for Very Strong (VS) service
   - Implementation of Advanced Placement Discrepancy Report to assist schools in identifying students from underrepresented populations for AP course enrollment
   - Partnership with Equal Opportunity Schools (EOS) in high schools to shift mindsets regarding inclusive recruitment of students for AP and IB courses

2. **Talent Development Expansion**
   - Ongoing expansion of K-1 Nurture program
   - Revision of Grade 2 Nurture through adoption of Primary Education Thinking Skills (PETS) curriculum and CogAT awareness lessons
   - Implementation of the Advanced Learner Talent Development model which identifies high potential students to participate in pull-out enrichment

3. **Increased Availability of Advanced Coursework**
   - Differentiation techniques and strategies for Eureka, Open Up and ARC
   - Definition of qualitative distinctions between Standard and Advanced/Honors ELA
   - High School English I and high school science and social studies courses available in Grade 8
   - Implementation of Pre-AP English and Pre-AP Biology in high school
   - Increased AP course offerings and student participation in AP Computer Science in high school

4. **Teacher Recruitment and Development**
   - Partnership with Duke University for AIG Add-On Licensure
   - Additional content-specific differentiation workshops
   - Professional learning topics to address underrepresented populations

The Academically Gifted department welcomes feedback. Questions may be directed to Dibrelle Tourret (tourred@gcsnc.com).

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Appendix 6: NCDPI Call to Action Issue Brief

CALL TO ACTION

Critical Actions to Realize Equity and Excellence in Gifted Education
Changing Mindsets, Policies, and Practices

Increase access and opportunities to increase achievement and growth for all

In gifted education, we seek to meet the advanced learning needs of students all day, every day. However, inequities rooted in larger society plague education, often leading to inequitable representation in gifted programs. Although schools cannot fix larger societal inequities on their own, we can ensure that our actions do not compound these inequities. Our goal must be to promote both equity and excellence. We must take actions to increase access and opportunity, which increases achievement and growth for all. We must assure that student racial, ethnic, economic, or other demographic factors do not reduce their likelihood of access and successful participation in advanced programming. By realizing equity and excellence in gifted education, schools will help all students reach their full potential.

What is Equity and Excellence in Gifted Education? What is it not?

- It is not about 'status' or sacrificing needs of one group of students for another; *it is meeting the needs of all students.*
- It is not seeing students at-risk; *it is seeing students at-potential.**
- It is not having multiple hoops to show a student's perfection in everything; *it is about multiple opportunities for students to demonstrate their potential.*
- It is not providing the same services to all; *it is adjusting services based on demonstrated needs of students.*
- It is not about all students receiving the same content at the same time at the same pace; *it is about personalized learning.*
- It is not about putting up barriers and hurdles; *it is about expanding access and opportunities.*
- It is not based on a national comparison for local programs; *it is based on local context and data.*
- It is not only recognizing students who come with easily recognizable gifts and talents; *it is about being a talent scout and intentionally creating environments to recognize and develop talents not yet tapped.*

Critical Actions to Realize Equity and Excellence in Gifted Education

Changing Mindsets, Policies and Practices

To set the foundation for realizing both equity and excellence, we must approach it from the shared perspective that both can be realized. Both are integral to a successful educational environment. This commitment toward equity and excellence is urgent and requires intentional and sustained actions. No single action will change mindsets, policies, and practices; we must synergize efforts to increase achievement and growth for all.

ACTION 1: Reframe your Lens

We must reframe our lens on how we view students, their actions and beliefs; how we view schools, our actions and goals; and how we view ourselves, our roles and responsibilities.

How? Reflect on our own biases, stories, and influence. Connect with student experiences. View students as "at-potential" versus "at-risk."* Be a talent scout not a deficit detector. Look for opportunities to say yes, not opportunities to say no.

Why? By reframing our lens, we ensure that all students have an equitable opportunity to access gifted programs. We begin to change our mindsets, raise expectations, and begin the pathway toward equity and excellence.

ACTION 2: Use Equitable Identification Practices

We must provide opportunities for every student to show us their strengths and talents and mitigate systemic barriers to access gifted education.

How? Align identification practices with the services provided. Use universal screening and referral practices. Use local norms and context for local programs. Take advantage of existing student data and a variety of information sources. Provide multiple opportunities, not multiple barriers.

Why? By improving identification practices, we focus on recognizing demonstrated advanced learning needs so that no potential is untapped and no student is overlooked for gifted education.

ACTION 3: Provide a Range of Services within the Program

We must match the educational environment with each student's demonstrated educational needs. Gifted services must adjust to the student instead of the student adjusting to the services.

How? Provide differentiation in the regular classroom, but that will be insufficient for some students. Offer a variety of services in a variety of settings. Accelerate, extend, and enrich learning experiences. Heed academic, social, emotional, and cognitive needs.

Why? By providing a range of services, we respond to the range of needs and we teach students only what they don't already know so that they will optimally develop, all day, every day.

ACTION 4: Foster Talent Development

We must also cultivate potential in students whose strengths are not yet tapped or readily observable in typical classroom environments, in addition to serving students who are already demonstrating high performance. We must provide intentional efforts that bring out and develop a student's strengths and talents.

How? Create learning environments where teachers are able to observe student strengths and recognize potential. Respond by developing a student's strengths through intentional learning experiences in various domains. Provide early intervention and development opportunities to maximize potential.

Why? By fostering talent development, we will ensure that all students have opportunities to grow and experience learning environments that are not dependent on their background or economic means.

ACTION 5: Collect and Use Meaningful Data

We must seek out and be responsive to meaningful data so that we align information with actions and aspirations.

How? Begin with the end in mind. Form a team to gather expertise and existing data. Use your program vision and goals to determine relevant data to analyze. Collect new data to fill gaps. Disaggregate the data and look at patterns and trends over time. Share information to inform mindsets, policies, and practices.

Why? By collecting and using meaningful data, we will assess program success and inform program improvement. We will determine if the right interventions are being used in the right way, at the right time, to meet each student's needs.

ACTION 6: Provide Focused Professional Learning Opportunities

We must provide a clear focus on the above critical actions in professional learning opportunities to realize equity and excellence in gifted education.

How? Facilitate professional development in a variety of settings and modes. Involve all -- the total school community, including partners in and out of school. Develop shared ownership to synergize efforts. Focus on changing mindsets, policies, and practices.

Why? By providing focused professional development, we remove systemic barriers, improve student services, share ownership and move closer to equity and excellence in gifted education.

*Coleman, M.R., Shah-Coltrane, S., & Harrison, A. (2010). U-STARS~PLUS: Teacher's observation of potential in students: Individual student form. Arlington, VA: Council of Exceptional Children.

Public Schools of North Carolina
State Board of Education
Department of Public Instruction

AIG
ALL DAY, EVERY DAY

Duke TIP
Duke University Talent Identification Program

For more information:
Visit NCDPI at
http://www.ncpublicschools.org/advancedlearning/aig/
or contact Sneha.ShahColtrane@dpi.nc.gov

For more information:
Visit Duke TIP at
www.tip.duke.edu/equityandexcellence

This initiative is aligned with the #NC2030 plan and the State Board of Education goals.