

## **The Mathematics Education of African Americans in North Carolina: From The Brown Decision to No Child Left Behind**

**Vincent T. Snipes, Ph.D.**  
Winston-Salem State University

**Roderick D. Waters, Ph.D.**  
African American Historian

**ABSTRACT:** For several years now, an achievement gap has been in existence between African American students and white students in mathematics. The purpose of this study is to (1) report on an in-depth case study of a former state mathematics consultant to describe his experiences of the mathematics education of African Americans in public high schools in North Carolina from 1950-1980 and (2) to examine North Carolina African American students' progress in mathematics from the Brown vs. the Board of Education Decision to the *No Child Left Behind Act* Era. The data for this study are analyzed utilizing the critical race theory of education perspective.

### **Introduction**

In recent years, there has been considerable discussion in the American public about the achievement gap that exists between minority students and White students in the public schools. As a response to this concern, the *No Child Left Behind Act* (NCLB) was passed in 2002 by the federal government to address this achievement gap. However, it may take years to determine whether the *No Child Left Behind Act* (NCLB) has positively impacted the achievement gap.

During the late 1970's, researchers began to examine the status of African Americans and other minorities in the mathematical sciences (Johnson, 1984). Researchers discovered dismal results that indicate there is underrepresentation of African Americans in upper level mathematics courses and mathematics related careers (Quality Education for Minorities in Mathematics, Science, and Engineering Network (MSE Network), 1992; National Science Foundation (NSF), 1993). Only within recent years have there been research studies focusing exclusively on African American mathematics students (Moses-Snipes, 2004; Lattimore, 1996; Chappell, 1991; Cousins, 1995; Strutchens, 1993; Thomas, 1993).

In the United States, remedial mathematics classrooms contain large numbers of African American students; however, advanced mathematics classes mainly serve White students (Matthews, 1984; Johnson, 1984; Oakes, 1986b; Oakes, 1990). The students in low-level mathematics courses are mainly African Americans and other non-Asian minority students. Of the total American population, 12%-13% of the people are African American; however, of the population of practicing Ph.D. mathematicians, less than 1% are African American (NSF, 1999; Cooper, 2000). From 1983-2002, just 176 out of 10,486 (1.7%) Ph.D's in mathematics were awarded to African Americans (Nelson, 2002).

When students have low test scores on standardized mathematics exams and low grades in the mathematics classroom, it is often referred to as “underachievement”. African American students have demonstrated poor mathematics performance on numerous standardized tests (National Center for Education Statistics (NCES), 2003; Anick, Carpenter, & Smith, 1981; National Assessment of Educational Progress (NAEP), 1992; Reyes & Stanic, 1988). For many years African Americans have not performed as well as their White counterparts on standardized mathematics exams such as the SAT and NAEP exams (Matthews, 1984; Bridglall & Gordon, 2004).

There is a relationship between underachievement and underrepresentation. When a student has low test scores, he or she will rarely be placed into upper level mathematics courses. If a student has low grades in the mathematics classes, the student will not usually go on to take many more upper level mathematics classes. If you do not take upper level mathematics courses, you have limited your scientific career options, where opportunities to enter into a mathematical field are drastically decreased.

The purpose of this study is to (1) report on an in-depth case study of a former state mathematics consultant who described his experiences of the mathematics education of African Americans in public high schools in North Carolina from 1950-1980 and (2) to examine North Carolina African American students’ progress in mathematics from the Brown vs. the Board of Education Decision to the *No Child Left Behind Act* Era. The critical race theory of education framework is the lens through which this study is framed. From document examination and an in-depth case study of a former mathematics curriculum specialist at the North Carolina State Department of Public Instruction, a description of the mathematical educational experiences of African American students can be created. The research study discussed in this article is part of a larger research study.

Mathematics educators realize that the factors that have contributed to the problems that African Americans and other minorities have faced in the mathematics classroom did not just begin roughly twenty to twenty-five years ago. Research literature does not really address aspects of the mathematics education of African American students before the early 1980s. By studying the mathematics education of African Americans before desegregation, successes of the mathematics education of African American students can be uncovered. Consider that segregated, African American communities and their Historically Black Colleges and Universities (HBCUs) educated the vast majority of African American in the U.S. until desegregation. This study helps to fill a major void in the educational literature by bridging the gap between the past and the current research literature.

## Review of Literature

### *No Child Left Behind Act*

On January 8, 2002, President Bush signed the *No Child Left Behind Act* (NCLB) into law to begin educational reform designed to improve student achievement and change American school culture (Jones & Hancock, 2005). This reform provides an increase in federal money to states to improve low-performing schools, and the federal government expects the state education systems to make sure that no child will be left behind. To meet this requirement, the states are to implement student testing, collect and disseminate subgroup results, ensure highly qualified teachers, and guarantee that all students from all socioeconomic backgrounds achieve academic proficiency by 2014-2015 school year (National Conference of State Legislatures (NCLS), 2005). *No Child Left Behind* is supposed to help to improve mathematics achievement by (1) creating mathematics and science partnerships, (2) increasing the ranks and pay of teachers of math and science, and (3) funding research to determine the best way to teach mathematics and science and measure students’ progress in mathematics (U.S. Department of Education, 2004).

With NCLB, harsh penalties can be sanctioned against schools that do not make “adequate yearly progress” (AYP). The state is allowed to restructure schools, change the curriculum, extend the school length, and replace personnel responsible for the failure to make AYP (NCLS, 2005). Some individuals are concerned about students enrolled in “failing” schools as identified by NCLB (Jones & Hancock, 2005). What will happen to the students who are in the “failing” schools? Will students from low-income backgrounds get a quality education if good teachers and good students from these failing schools leave? Some public schools are encountering segregation and re-segregation problems (Jones & Hancock, 2005).

### *Brown v. Board of Education Decision*

On May 17, 1954, the U.S. Supreme Court issued the landmark ruling in *Brown v Board of Education of Topeka, Kansas*. The Court recognized that separation of students by race was a means of perpetuating white dominance in every important aspect of life (Bell, 1983). The Supreme Court’s ruling in the *Brown* case not only revoked the “separate but equal” doctrine, which was used to legally sanction segregation not only in public education but in all aspects of daily life among African Americans and white Americans. It also became a catalyst for the modern Civil Rights Movement. According to A. Leon Higgingbotham, “...the Civil Rights Act (1964), the Voting Rights Act (1965), the Fair Housing Act, etc., all are rooted in Brown’s delegitimation of racism” (Wiley, 1994).

There existed much opposition to the *Brown* decision, and it took further rulings from the federal courts to instruct the states to act with “all deliberate speed” with respect to desegregating its public schools. The “all deliberate speed” ruling actually came from the *Brown II* decision handed down in 1955 as a result of widespread resistance to the *Brown I* ruling (Smith, 2005). Critics of both *Brown* decisions stated that they did not do enough for African Americans. By desegregating the public schools, more than half of African American principals and more than six thousand African American teachers in Southern and Border states either lost their jobs or were demoted (Wiley, 1994). The critics stated that in addition to loss of jobs, the segregated African American neighborhoods where the educators lived and cared for African American students as valued individuals were lost. For example, in North Carolina, the number of African American principals dramatically decreased from 620 to 170 between the years 1967-1970, a decrease of greater than seventy-three percent (Wiley, 1994).

### *Critical Race Theory of Education*

According to Monaghan (1993), critical race theory was created by minority legal scholars in the 1970’s because they felt they were being overlooked in critical legal studies, a movement that examines the way law encodes cultural norms. Critical race theory became a theory that some scholars believed could be utilized to examine the educational system.

Ladson-Billings and Tate (1995) shared some common features in the critical race theory movement: (1) racism is embedded in everyday American life, (2) a call to examine civil-rights laws that are undermined before they can fulfill their promise, (3) a challenge to neutrality, objectivity, color-blindness, and meritocracy as a cover for the self-interest of dominant groups in society, (4) insistence on subjectivity and the reformulation of legal doctrine to reflect the perspectives of those who have experienced and been victimized by racism firsthand, and (5) the use of stories or first-person accounts.

Ladson-Billings and Tate (1995) applied critical race theory to the educational system, which consisted of two main themes: (1) understanding race and (2) understanding

property. Ladson-Billings and Tate's (1995) discussion of school inequity is based on three central propositions:

1. Race continues to be a significant factor in determining inequity in the United States.
2. U.S. society is based on property rights.
3. The intersection of race and property creates an analytic tool through which we can understand social (and, consequently, school) inequity.

While utilizing the critical race theory of education to study school inequity in the United States, I will focus on two main areas: (1) institutional and structural racism and (2) property rights.

Institutionalized and structural racism is when an organization's rules, procedures, and practices carried out by members of the dominant group have a negative impact on members of the subordinate group. Examples of institutionalized and structural racism that affect the mathematics learning of African American children:

- (1) Tracking- Many African American children are tracked into lower level mathematics classes (Oakes, 1986b; Oakes, 1990; Tate, 1995)
- (2) Lack of exposure to better teachers- In many of the low level mathematics classes, the students are African American and non-Asian minorities. The lower level classes are not taught by the better, more experienced mathematics teachers (Oakes, 1986b; Tate, 1995).
- (3) Less access to technology- African American students are not receiving access to technology in the mathematics classroom such as calculators and computers. Students enrolled in the lower level classes do not get to experiment with this type of technology (Oakes, 1986b; Tate, 1994). Students in the lower classes work more with paper and pencil.
- (4) Disconnection of classroom mathematics to home environment- The mathematics curriculum does not include experiences from the lives of African American students and the lives of other minorities, even though that is an aim of the Professional Standards developed by NCTM (Tate, 1994; Lattimore, 1996)

Property rights is a key issue in examining the mathematics education of African American students. Bell (1980) says democracy in the United States context was built on capitalism and society was based upon property rights. The ability to define, possess, and own property have been features of power in the United States, thus property owners have a sense of power. When discussing property rights and the critical race theory of education, there are two kinds of property: "intellectual property" and "whiteness as property" (Ladson-Billings & Tate, 1995).

The mathematics curriculum represents a form of "intellectual property" (Ladson-Billings & Tate, 1995). Curriculum is defined as a plan for instruction that includes what mathematical content students need to know, how students will learn the content, how teachers are to help implement the curriculum, and the context in which learning and teaching will occur, and how progress will be assessed (NCTM, 1989). The quality and quantity of the curriculum varies with "property values" of the school. The access to enriched intellectual property is referred to today as "opportunity to learn" (Ladson-Billings & Tate, 1995). The value of "intellectual property" is raised by things such as access to the latest computers, software, the internet, graphing calculators, and qualified teachers that

use effective teaching methods.

According to Harris (1993), the skin color of whiteness is the ultimate property. Possession, the basis for rights in property, has been defined to include the cultural practices of whites. From this definition, the idea that whiteness is valuable and property was created. Harris names four “property functions of whiteness” as:

(1) Rights of disposition- white property is being rendered alienable when students are rewarded for following perceived “white norms” or sanctioned for cultural practices such as unauthorized conceptions of knowledge or speech patterns.

Ex. According to Kunjufu (1988), African American students who performed well in school were accused of acting “White” by their peers. Mathematics is seen as a White field by some African Americans because of the underrepresentation of African Americans in this area. African Americans performing well in the mathematics classroom are sometimes perceived as acting “White” to fit into the classroom environment.

(2) Rights to use and enjoyment- Whiteness allows for specific social, cultural, and economic privileges. The structure of the curriculum reflects the right of use and enjoyment, as very few topics from minorities’ everyday lives are included in the curriculum.

Ex. Rarely will mathematics textbook publishers include mathematical activities that are built on the cultural contexts of minority students. Showing the picture of a minority student in the text is not implementing culture into the activity.

(3) Reputation and status property- In the case of schooling, a program described as non-white diminishes its reputation or status. The word “urban” has come to mean Black and “suburban” White. When “urban” students are bused to suburban schools, these schools have their reputation tarnished.

Ex. At a predominately Black high school, it was announced that the school would include a new mathematics and science academy. When it was announced that the school received the program, some White parents were upset that a school comprised of predominantly African American students from a low socioeconomic background received the program. Thus, some White parents said they would not send their children to that school.

(4) The absolute right to exclude- Whiteness is seen in society as the absence of Blackness. In schooling, Black students were denied access to schooling altogether at one time. Later, separate school systems were developed for Blacks and Whites. In recent years, White flight, insistence on vouchers, schools of choice, and tracking within schools have maintained exclusion of some Black students from a quality mathematics curriculum.

### Methodology

The purpose of this study is to (1) conduct an in-depth case study of a former state mathematics consultant to describe his experiences of the mathematics education of African Americans in public high schools in North Carolina from 1950-1980 and (2) to examine North Carolina African American students’ progress in mathematics from the *Brown vs. the Board of Education* Decision to the *No Child Left Behind Act* Era. The critical race theory of education framework is the lens through which this study is framed. The period from 1950-1980 was selected because of the occurrence of several important events during this time frame.

First, the Supreme Court rendered the *Brown v Board of Education* court decision in 1954 that stated segregated schools were not separate and equal. In the 1960’s, the civil

rights movement was occurring in the United States, and mass school desegregation began to transpire in the mid-to-late 1960's in the South.

The Russians sent up the satellite "Sputnik" in 1957, which made the United States feel behind in regard to space exploration. The United States became determined to become number one in the world in space travel, so the National Defense Education Act (NDEA) was passed in 1958 (North Carolina State Department of Public Instruction. Strong emphasis was placed on the mathematics and science curriculum in the American public schools. The "New Math Movement" started in the 1960's and lasted into the 1970's.

Finally, the *No Child Left Behind Act* is of interest because this is the nation's latest major educational reform.

### Design

Data collection methods utilized for this study include the conducting of an in-depth case study of a former state mathematics consultant and the examination of published historical documents, which are relevant to education in North Carolina during the specified period of time. The research study discussed in this article is part of a larger research study. The research questions for this study are:

1. What was the mathematics education experience of African Americans in public high schools in North Carolina from 1950-1980?
2. From the *Brown v Board of Education* decision to the *No Child Left Behind Act*, what progress have North Carolina African American students' made in mathematics?

Case studies must be utilized to gather information about the mathematics education of African American students because mathematics education literature does not address any aspects of the mathematics education of African American students before the late 1970's-early 1980's. Several individuals were interviewed, but the mathematics education of African Americans is described through the perspective of a former state mathematics curriculum specialist. A variety of documents were examined to find out about the mathematics curriculum accessible to the African American students, standardized test scores, course enrollment figures, and studies that have been done that are relevant to the research questions. Published documents include manuscripts, journal articles, newspaper articles, annual school reports, state agency publications, and other written records.

### *Selection of Case Study Individual*

Criterion sampling was utilized to choose a former state mathematics consultant for the case study (Patton, 1990). For this study, the mathematics person must have at least twenty-five years experience, worked before and after integration, and have had considerable interaction with African American high school students. I compiled a list of current or retired mathematics teachers throughout the state of North Carolina. After personally speaking to people on the lists, the mathematics consultant was chosen for the case study.

### *Instrumentation*

For this qualitative case study, the researchers served as the primary instrument (Stake, 1995). Because we conducted all the interviews and examined the documents, it was important to be aware of our subjectivity. For this reason, other investigators interpreted parts of the collected data.

The participant was interviewed for a total of three hours initially. After the initial

interview, follow-up interview questions varied, due to initial interview responses and personal experiences. Each interview was audiotaped for transcription later.

### *Triangulation*

Triangulation was established for this study through (1) methodological triangulation, (2) data triangulation, and (3) researcher triangulation. I established methodological triangulation by the using multiple data collection methods of document analysis and interviewing. Data triangulation was established by utilizing data from interviews, manuscripts, journal articles, annual school reports, state agency publications, and various other written records. Lastly, because multiple investigators examined the data, researcher triangulation is satisfied.

## **Findings and Data Analysis**

The name of the participant, schools, and cities have been changed to protect the identity of the participant. The mathematics teacher was given the name Mr. Smith. Through the analysis of data, the following categories emerged: mathematics achievement, mathematics curriculum, instruction, attitudes and expectations, and policy.

### *Case Study- Mr. Smith*

Mr. Smith is a White male from a small rural community in Southeastern North Carolina. As a youngster, his family's socioeconomic status was lower middle class. Mr. Smith attended North Carolina State University where he graduated with a B.S. in Mathematics Education in 1959. He began teaching after graduation at a large all White high school in central North Carolina (1959-1962). During the 1961-62 school year, Blue High School, which had 2200 students, was integrated with 3 Black girls. He was the mathematics teacher for all three of the Black girls. He believed that the principal assigned them to his class because he was one of the younger mathematics teachers on the staff and probably had more liberal views about the process of desegregation. As the teacher of these Black girls, he had the same high expectations of them as for the White students, and he made a strong effort not to make them ever feel like he was singling them out of the crowd.

Mr. Smith completed a M.A. in Teaching Mathematics from the University of North Carolina-Chapel Hill, and became a mathematics curriculum specialist in 1965 for the North Carolina State Department of Public Instruction. As a mathematics consultant (1965-1993), his job was to try and determine what the mathematics programs were like in the schools in North Carolina and what the needs were, in terms of staff development for teachers, materials, and things of that nature. In his first year at the North Carolina State Department of Public Instruction (NC SDPI), he visited about 95 schools and sat in classrooms and observed teachers working. He worked with Black schools, White schools, and Native American schools throughout the state. In 1974 Mr. Smith received a Doctorate in Educational Administration and Supervision from Duke University. In 1993, Mr. Smith retired from the Mathematics Division for the North Carolina State Department of Public Instruction. Mr. Smith was honored for his outstanding contributions to mathematics education by the state organization for mathematics teachers.

Mr. Smith is sincerely interested in the mathematical success of all students. Throughout our study, he has been very helpful in providing me with leads to assist in my collection of data. Individuals involved in mathematics education across the state respect and admire Mr. Smith for his honesty and willingness to address challenging issues. The data obtained from my interaction with Mr. Smith can be grouped into five main categories: mathematics achievement, mathematics curriculum, instruction, attitudes and expectations, and policy.

### *Mathematics Achievement*

When Mr. Smith became a mathematics consultant for the North Carolina in 1965, he realized that the mathematics achievement of African American students needed to be addressed at the state level.

Interviewer: Were there any times when you were at the state department that you all discussed how the African American students in this state needed to improve in the mathematics classroom? And if you all talked about this, did the state try and put in place some strategies to indicate to the teachers to try this or create a new program?

Mr. Smith: Yeah, I can think of a lot. Probably during my whole 28-year career at the state department, that whole issue of getting all our kids to perform at an acceptable level. Not leaving one group behind because of their ability or color was discussed. Bringing them all along was discussed and staff development was earmarked for that. We first tried to make our teachers aware that they have a situation that they may not be aware of. I would say this to teachers all the time at workshops. Go to your schools, go down the halls. Say you have your classes that range from General Math, Algebra I, Geometry, Algebra II, Advanced Math. The further you go down the hall, the whiter the classes are going to get. Be aware of that; for whatever reason, the Blacks kids are not opting to take the upper level math courses. You don't wait until youngsters get to high school; you look at them in middle school and upper elementary school. You see a kid that shows promise, nurture them, and recruit them because they may be from a broken home situation where they don't get nurturing at home... If you don't have someone at home pushing you to take those tough courses and math teachers at school are finding easier courses for you to take that are not serving you well at all, they need to hold your feet to the fire and say it's hard but--now you can't get into any one of the 16 branches of the University of North Carolina without Algebra I, II, and Geometry.

As a mathematics curriculum specialist, Mr. Smith informed mathematics teachers around the state that African American students were not enrolling sufficiently into the upper level mathematics courses. He suggested to teachers to identify bright African American elementary and middle school students and encourage them to take the quality mathematics courses that prepare them for college. As he visited various school districts in North Carolina, he noticed that as the mathematics class level increased, less African American students and other minority students were enrolled (Oakes, 1992; Tate, 1995). Mr. Smith mentions that teachers were tracking the African American students into easy courses that did not prepare them for the future, which restrains these students from acquiring the best possible "intellectual property" available at their school (Oakes, 1992; Tate, 1995).

### *Mathematics Curriculum*

Mathematics curriculum represents a form of "intellectual property" (Ladson-Billings and Tate, 1995). Mr. Smith's experience at the state department helped to provide insight about the mathematics curriculum of North Carolina.

I: From 1959-62, were you aware of what the curriculum was like for some of the Black schools?

S: I had no idea. It was not until I came back and joined the state department and began to visit the schools, white, black, Indian schools all over the state that it dawned on me that there were differences. The black schools were getting old textbooks.

As a regular classroom teacher from 1959-62, Mr. Smith had no interaction with black teachers or knowledge of activity in black schools due to segregation. He mentions that the black schools were receiving old used textbooks when he arrived at the state department. This illustrates that things were not "separate and equal" in terms of school materials for the black and white schools in North Carolina during segregation.



Also, this act of passing down used, old textbooks to black students is an example of institutionalized racism as discussed in critical race theory of education (Ladson-Billings & Tate, 1995). It was cheaper to give the black schools used books, as opposed to buying new books for the black and white schools. For some teachers, the textbook is seen as the mathematics curriculum. The use of old textbooks detracted from the black students' "opportunity to learn" and diminished the quality of their mathematics curriculum, or "intellectual property" (Tate, 1995).

In the initial conversation with Mr. Smith, he mentioned the curriculum in Black and White high schools before desegregation. Here is dialogue that we had during an interview together:

I: You say it was required to take Algebra I in the black schools? What were the math courses that they were taking at the White schools during that time?

S: They were taking Algebra I. The curricula were pretty much the same, but in the White schools it wasn't a requirement to take Algebra I, but it was desired by the parents. The content of the course might have been a little different, but that's another story....The white schools all tried to offer Algebra I, Algebra II, Geometry and Advanced Math even if they were small schools. They made an effort to do it even if they had to alternate so one year you wouldn't offer Algebra II you'd offer Geometry, next year you'd offer Algebra II, that way you would enable the kids to get 4 years of high school math....I remember about the black schools that in most of them Algebra I was a required course and that was not true in white schools; it was an elective...That Algebra I is a gatekeeper course. If you don't get Algebra I, you can't get the others. ...The (Algebra I) requirement has opened up a lot of people's eyes and caused a lot of anxiety. It is probably the only way we could have gotten this situation half way turned around.

I: At the white schools, if Algebra I wasn't taken, then what mathematics courses did they graduate with?

S: They could take General Math I, II, or Consumer Math and graduate and never reach the Algebra I course.

It is quite evident from conversations with Mr. Smith that he was impressed that many of the black High Schools had an Algebra I requirement even before integration. He stated on several occasions that Algebra I is a gatekeeper course, and without it students will not get to Geometry, Algebra II, and the other upper level courses. Mr. Smith was a strong supporter of the Algebra I graduation requirement that was implemented in North Carolina in 1991 because it legally required schools to place African American students and other minorities into Algebra I courses. Furthermore, he informed me that North Carolina was the second state to make Algebra I a graduation requirement.

The North Carolina Superintendent of Public Instruction (1952; 1954; 1956; 1958; 1960; 1962; 1964; 1968; 1970) Biennial Reports and North Carolina Division of Research Department records (1974) support Mr. Smith's observation that the black high schools did not offer as many upper level mathematics courses as the White high schools in North Carolina (Refer to Table 2 in the Appendix). After integration, course enrollment data for North Carolina was not broken down according to race.

#### *Instruction*

Without any question, instruction affects the student learning process. Mr. Smith shared his experiences as a long time mathematics consultant for the state department regarding his observation of instruction in the North Carolina public schools:

I: Did you see any differences in the methodologies that the math teachers were trying to use in the predominantly white schools as opposed to the predominately Black schools in your early years at the state department? Was it pretty much the same?

S: Yeah. Believe it or not, pretty much the same. There was too much lecture, show and tell, and kids sitting pretty much idly by in all the schools that I observed. The kids were just not involved.... As far as methodology, show and tell was predominate in all the schools I visited. Even today it is still too much of that.

Oftentimes, people wonder whether or not there were many differences in the classroom instruction of white teachers and black teachers during segregation. There was virtually no contact between white schools and black schools prior to desegregation. According to Mr. Smith, the methodologies utilized in the mathematics classrooms by white and black teachers were pretty much the same. Mathematics teachers wrote on the board mainly, lectured, and used show and tell. During the 1960's at the black and white high schools, the students were not active participants in the mathematics lessons. The students basically sat in their desks and wrote down what was said or written on the board.

I: Were the black mathematics teachers as qualified as the white mathematics teachers in North Carolina in the mid 1960's when you started working at the state department?

S: The black teachers were certified in mathematics just like the white teachers, and no more of the black mathematics teachers were teaching out of field at the black high schools as white mathematics teachers in the white high schools. Since 1964, the state of North Carolina has required that teachers pass national teacher exams in their subject area to obtain certification.

In 1950, black teachers had received an average of 4.0 years of college training, compared to 3.8 for white teachers in North Carolina (Ashmore, 1954). This indicates that the black teachers had a track record of having a sound educational foundation. In 1964, the National Civil Rights Act was passed, and discrimination was prohibited in public education, and this is about the time when gradual desegregation began in North Carolina (SDPI of NC, 1994). Thus, the best and brightest teachers were still working in the black high schools when Mr. Smith started working at the state department as a consultant. Furthermore, North Carolina has more Historically black Colleges and Universities than other states, which would have provided a large, educated pool of black teachers to select from.

In later conversation, we touched upon state monitored programs that impacted mathematics instruction:

I: I saw in some of the records that some school systems had money supporting the National Defense Education Act. Was the National Defense Education Act just for math or science?

S: Strictly for math and science and I believe it did include foreign language. It grew out of Sputnik. It came out of the scare of the Russians in 1958. I think it got started about 1962. But the major portion went to math and science, and they would submit a project to your state department that would include overhead projectors, screens, chalkboards, graph chalkboards and that kind of thing.

Mr. Smith found the National Defense Education Act (NDEA) program beneficial to mathematics instruction in North Carolina. It provided money for educational equipment such as overhead projectors, chalkboards, and other supplies. Also, the NDEA funded

mathematics training institutes for teachers and students to attend (NC SDPI, 1963a, b). This program enhanced the existing mathematics curriculum and supported it financially, which helped to strengthen the mathematics curriculum, or “intellectual property” of mathematics students throughout the State, especially for African American students (Tate, 1995). Interviews with several former African American mathematics educators also document the importance of the National Defense Education Act. Many African American mathematics teachers began working on graduate degrees by attending NDEA sponsored summer institutes, where participants were paid a stipend for attendance. This knowledge that the Black teachers received during this “New Math Era” was shared with the black students during instruction when they returned during the school year.

### *Attitudes and Expectations*

Attitudes and expectations are crucial in the development of the mathematics classroom environment. For several years Mr. Smith was exposed to various attitudes and expectations regarding mathematics classes. Mr. Smith answered the following questions concerning mathematics, attitudes and expectations, and African American students:

I: When you used to visit the predominantly white high schools around the State, what would you say the attitudes were like for a lot of the teachers about the ability of the black students to do the upper level mathematics? From your experiences of sitting in the classrooms on your visits, what would you say about their attitudes?

S: Low expectations. Touching on it again that I observed when visiting schools, I found when I visited all black schools, I found that in most black schools Algebra I was required. I verified that since. I talked to a lot of older black math teachers. Now when you came through school, it might not have been like that. For them, they remember that Algebra I was required. Now whether it was the Algebra I content wise of other schools in the district, I have some questions about that, but it was Algebra I as they defined it, which was required. It was not required in the high schools of the white schools.

S: We didn't do as good a job of recruiting black kids into academics as we did in sports. The high school football or basketball coach doesn't know if you can bounce a ball and chew gum at the same time or not, but he'll say come on out and I'll work with you. Do we do that in math? No. We say this course is too hard for you. You should be in General Math. We are disinviting in math. We have always been like that. We're intimidating and steer the kids away. We try and find an easier course for them, instead of saying this course is hard, but I'm going to work with you to see that you pass it....We have really relied on test scores and hidden behind test scores as an excuse not to address and change strategies. Rather than saying we're going to deal with you differently, we will just put you in an easier class. What message do I send you if I just take you out of Algebra I and place you in General Math? The message is that I don't expect much out of you, even if I take you out of Algebra I and put you in two-year Algebra I. That's like sending you back to Class AA baseball. I expect you to be able to perform.

From Mr. Smith's twenty-eight years of experience as a mathematics consultant for the state, his observation was that many of the teachers had low expectations about the ability of black students to perform in upper level mathematics. He makes an interesting comparison between the recruitment of black students in academics and in sports. In sports, the coach encourages all students to try out and promises to work with them; however, Mr. Smith asserts that these same black students are not invited to enroll in challenging mathematics courses, nor told that they will receive help to pass these challenging courses by the teacher, and are steered into taking easier mathematics courses. Course enrollment

decisions influence how successful students can become in the area of mathematics.

His comments indicate that he believes that too many schools rely on standardized test scores to place students. Instead of developing strategies to correct students' deficiencies in mathematics, the schools just place the students in the easy, low-level mathematics courses. The schools have the attitude that the students with average to below-average test scores cannot push on and become successful in those college prep mathematics courses.

From the initial interview guide, Mr. Smith wanted to respond to a particular question because he believed it was again related to expectations:

S: There is a question that I would say a little more about. It says, "After integration, was there restructuring done in your mathematics department?" I would say yes to that. There was more, here again it goes back to low expectations, there were more easier ways out, more general math classes, more beginning algebra with two years, consumer math; it grew and became a staple in the curriculum. I think that was done as a way to meet the needs of kids that they didn't think could perform otherwise...In summary, over the years to a greater extent with the minority students, we looked at math as you have to be special to do math, have a special aptitude to do math. We have not expected black kids to do well. Girls were in the same boat as black kids. They weren't taking the courses. Math today as I speak is a white male domain. Let's face it. There are still too many white males. If you go to the state math contest, which we just had in late April, there were 150 kids that qualified for the math contest from around the state. Before I go can tell you about the makeup, and it hasn't changed much over the 20 years that we had it. There are almost no blacks, a whole bunch of Asian kids, and mostly white males at the contest.

Mr. Smith indicates that after integration the state of North Carolina created additional low-level mathematics courses below Algebra I such as Consumer Mathematics and more general math courses, which is corroborated by NC State Department documents (NC Superintendent of Public Instruction, 1964; 1968). The schools did not think these African American students could do the mathematics, so these low level courses were created to accommodate them. He asserts that for many years African American students were perceived not to possess the aptitude to do mathematics because only special people could do mathematics.

#### *Policy*

As a mathematics consultant for the State, Mr. Smith was responsible for establishing policies regarding mathematics education. He addressed tracking policies that occurred throughout the state:

S: I saw more homogeneous or ability grouping in the white schools. In the black schools, you were steered to take Algebra I anyway, so no matter what, you were going to take that regardless of your ability level. In the white schools, you start with Algebra for two years, Algebra IA and Algebra IB. It was a way to get more kids to take algebra and a way to ability group. In North Carolina, well, studies have shown that we do more ability grouping than just about any state in the country... When we desegregated the schools, the kids that might have stayed in a black school and gone through Algebra I were sent to General Math, guided into General Math. Over the years we saw the problem remaining that the black youngsters were not taking the quality courses. For whatever reasons, peer pressure, low expectations, a variety of things, they just weren't taking the algebras or geometry, things that would lead you to the technological careers and that type of thing. That's why we have the Algebra I requirement in North Carolina. We weren't

getting the results with the black kids otherwise. They were not taking the upper level quality math courses. You know as well don't take Algebra I; you're not going to get to Algebra II; you're not going to get to the other math classes.

I: So, you're saying a lot of minority kids were getting placed in lower level courses?

S: No question about it. The numbers just skyrocketed. The numbers went down in Algebra I. That's why we came up with the Algebra I requirement. There is a special provision for special education kids. We're seeing more kids get through algebra than we ever thought by virtue of this requirement. I just wish we didn't have to have it, and kids were clamoring to take it.

When he became a mathematics consultant for the State, he observed more ability grouping in the white high schools than in the black high schools. At most of the black high schools, everyone was going to take Algebra I regardless of your ability. According to Mr. Smith, at the white schools, they created taking Algebra I for two years, with Algebra I Part A and Algebra II Part B, as a way to get more kids to take algebra and to ability group.

Mr. Smith feels that during desegregation the black kids that would have stayed in the black high school and taken Algebra I were tracked into general math. This appears to be a widespread informal policy of racism that limits students' access to a quality education (Tate, 1995). Throughout the years, the black students were not taking the quality mathematics classes that lead to technological careers. He states that this occurrence led to the formal policy of requiring Algebra I for graduation to ensure black kids would take some of the quality mathematics courses.

He also points out that the enrollment numbers went down during this transition period across the state in Algebra I at the high school level. The data presented in Table 1 (See Appendix) supports this assertion. From the 1963-64 school year to the 1972-73 year, the enrollment in Algebra I in North Carolina decreased 16,455 students or 23.4% (Table 1). Note that the 1963-64 year is the last year before desegregation efforts intensified in North Carolina. It appears that less African American students enrolled in Algebra I; however, the State of North Carolina did not provide Algebra I racial course enrollment numbers after integration for many years. Furthermore, the state of North Carolina did not compile any state course enrollment data from the 1964-65 year to 1966-67 year.

He insists that minority kids were getting placed in the lower level mathematics courses. The course enrollment data for North Carolina in Tables 2 & 3 (See Appendix) support his statement. In both Tables 2 & 3, course enrollment is divided into 3 categories: (1) low-level, (2) intermediate-level, (3) upper-level. The low-level category consists of mathematics courses below Algebra I. Intermediate-level courses consist of Algebra I and all geometry courses. Finally, the upper-level category consists of the mathematics courses Algebra II and higher.

Table 2 (See Appendix) reports the percentage of students enrolled at the aforementioned mathematics course levels and includes the racial distribution in North Carolina. In 1963-64, the last year before mass desegregation in North Carolina, enrollment in upper level mathematics courses reached an all-time high during the period 1950-80 in white schools (20.9%) and in black High Schools (12.1%). No state course enrollment data were compiled from the 1964-65 school year to the 1966-67 school year. During the 1967-68 school year, the state of North Carolina stopped publishing the racial composition for course enrollment. In Table 2, it shows that from 1967-68 to 1972-73 there was an overall steady decline in the upper level mathematics enrollment from 13.9 percent to 10.1 percent of all North Carolina high school students, which I attribute to the tracking of African American students into lower level mathematics courses.

Table 3 (See Appendix) is closely connected with Table 2 (See Appendix). The data presented for both dual racial school systems in North Carolina in Table 2 for years 1951-52 to 1963-64 are combined to create Table 3. The Combined mathematics course enrollment data from the 1953-55 year through 1963-64 year for the segregated school system show the percentage of students in North Carolina taking upper level mathematics courses increased steadily from 10.0 percent to 18.4 percent of all North Carolina high school students (Table 3). The percentage of upper level mathematics enrollment increased biannually during this entire period of time (reported biannually). In 1963-64, the combined upper level enrollment percentage is 18.4 (Table 3), and after integration in 1967-68 the percentage drops to 13.9 (Table 2). Again after integration of the dual school systems, from 1967-68 to 1972-73 there was an overall steady decline in the upper level mathematics enrollment from 13.9 percent to 10.1 percent (Table 2). This strong trend of data supports Mr. Smith's responses and establishes denial of "intellectual property", which is the mathematics curriculum, for African American students (Tate, 1995).

#### *Mathematics Progress of North Carolina African American High School Students*

Almost fifty years ago, the *Brown* decision brought hope to many as a means to bring equality in education to everyone. Today, the *No Child Left Behind Act* (NCLB) drives the public education system. With No Child Left Behind, standardized testing is a major issue in measuring student progress. The major goal of NCLB is to assist in improving the test scores of all students. Currently, there exists an achievement gap nationally in mathematics between high school African American students and white students.

On the 2000 National Assessment of Educational Progress (NAEP) mathematics test for twelfth graders, African American students had an average score of 273 and White students had a score of 307 (Bridglall & Gordon, 2004). Trends on the SAT Math test exhibit an achievement gap as well (Bridglall & Gordon, 2004). From 1996 to 2003, the average SAT Math score for African Americans was 425 as compared to 529 for White students.

For almost two decades, North Carolina has implemented End-of-Course (EOC) tests for Algebra I, Geometry, and Algebra II. The tests have been multiple-choice exams that allow the use of a graphing calculator. A score of level III or higher is considered being proficient on the test.

For the NC Algebra I, Geometry, and Algebra II EOC tests (See Tables 4, 5, 6), the scores are provided for African American students and white students from 2000-01 through 2003-04 (NC Public Schools, 2002, 2004). During this period of time, 62.2% of African Americans and 86.4% of white students scored at level III or better for Algebra I, which is a difference of 24.2%. African American students' grades increased each year since 2000-01. On the Geometry EOG test, a dismal 38.6% of African Americans and 78.5% of white students scored at level III or better, which is a difference of 39.9%, for the four-year timeframe. During that same four-year period, 58.8% of African Americans and 83.5% of white students scored at level III or better for Algebra II, which is a difference of approximately 24.8%. Based on the mathematics performance of African American students on these EOC tests, there is much room for improvement. African American students have the lowest test scores of any racial group on these three NC EOC tests.

The *No Child Left Behind Act* was signed into law in 2002. Since NCLB became a law, each state is monitored annually for "adequate yearly progress" (AYP) to make sure all racial groups are meeting standardized testing goals. In 2003, North Carolina had a goal of 54.9% of African Americans would score level III or higher in mathematics at the 10th grade level. Only 49.2% of African American students scored at level III or higher, so AYP was not met according to NCLB. In 2004, North Carolina again did not meet the AYP goal of 54.9% for African Americans; only 51.5% of the students scored level III or higher. The

mathematical performance of African American math students in North Carolina during the NCLB Era indicate that insufficient progress has been achieved mathematically for since the *Brown* decision.

#### *Limitations of Data Collection*

With all studies, the researcher encountered some limitations to the collection of data. The limitations of data collection faced during this study are: (1) red tape at the State Department of Public Instruction, (2) lack of assistance from state agency workers, (3) missing school system records at the state archives, and (4) relying on participant past memories for the interviews.

#### **Summary and Conclusion**

Mr. Smith's case study provided a description of the mathematics education of African American students in North Carolina during his service as a state mathematics consultant. The critical race theory of education framework is the lens through which this study is framed. Mr. Smith's responses to interview questions touch upon the two main areas of critical race theory of education: (1) institutional and structural racism and (2) property rights (Ladson-Billings and Tate, 1995).

During his tenure as a state mathematics consultant, Mr. Smith observed several instances of institutional and structural racism. First, he noticed immediately that the black students were receiving the used textbooks of the white students throughout the state. Another example of institutional and structural racism discussed by Mr. Smith deals with the tracking of African American students into low-level mathematics courses across the state. According to Mr. Smith, the teachers had low expectations about the ability of black students to perform in upper level mathematics courses.

Mr. Smith addressed "property rights" in our dialogue by discussing the "intellectual property" at the black high schools prior to integration (Ladson-Billings & Tate, 1995). In general, the mathematics curriculum at the black high schools had less mathematics courses available than at the white high schools. However, Mr. Smith was impressed with the black high schools because most of them required Algebra I for graduation, and the white schools did not, even though they had more course offerings. Furthermore, the African American mathematics teachers had comparable credentials to those of their white counterparts.

Before integration, Mr. Smith points out that at most of the black high schools it was expected and informally required that the black students take Algebra I before they graduated from high school. After integration, the attitude of many schools across North Carolina was that these African American students were not smart enough to take upper level mathematics courses. The schools did not expect the African American students to enroll into mathematics courses that would prepare them for college. Many of the African American students, especially after integration, were not being advised to register for Algebra I, which he calls a gatekeeper course. From conversations with Mr. Smith and about Mr. Smith with other people, it is obvious that he believed equity issues and mathematics were important and made efforts to improve access to a quality mathematics curriculum for all students.

The *Brown v Board of Education of Topeka, Kansas* decision was to end the dual so-called "separate but equal" school systems in the United States. During segregation, black students had teachers that believed in their mathematical intellectual capabilities and had positive academic expectations of the students. After integration, the number of black teachers that nurtured the black students declined (Wiley, 1994). At the integrated schools, the facilities and resources were better, but the black students had to deal with a learning environment where their intelligence was doubted (Harvey, W. & Harvey, A., 2005). The *Brown* decision was supposed to eliminate inequality in education, but was it the beginning

of the widening of the achievement gap?

The *No Child Left Behind Act* (NCLB) just like the *Brown* decision was enacted to improve public education opportunities for all Americans. *NCLB* came into existence as a law with a national achievement gap in mathematics between white students and other minorities. So far, North Carolina and other states are not meeting *NCLB* "adequate yearly progress" in terms of African American mathematics performance. If we penalize schools that do not meet "adequate yearly progress", will they get even worse? It is the hope of many Americans that *NCLB* will narrow the achievement gap that *Brown* was unable to do. There are many issues to consider about *NCLB*, but only time will tell, and there is much work to be done.

### References

- Anick, C. M., Carpenter, T. M., & Smith, C. (1981). Minorities and mathematics: Results from the National Assessment of Educational Progress. *Mathematics Teacher*, 74, 560-568.
- Ashmore, H. S. (1954). *The Negro and the schools*. Chapel Hill: University of North Carolina Press.
- Bell, D.A. (1980). *Brown v. Board of Education and the interest-convergence dilemma*. *Harvard Law Review*, 93, 518-533.
- Bell, D. (1983). Learning from our losses: Is school desegregation still feasible in the 1980s? *Phi Delta Kappan*, 64 (8), 572-575.
- Bridglall, B. & Gordon, E. (2004). The nurturance of African American scientific talent. *Journal of African American History*, 89 (4) , 331-347.
- Chappell, M. (1991). African American fifth-graders' visual-imagery constructions of tiling patterns and area measurement concepts (Doctoral dissertation, The Florida State University, 1991). *Dissertation Abstracts International*, 52 (02), 0454A.
- Cooper, D. (2000). Changing the faces of mathematics Ph.D's: What we are learning at the University of Maryland. In M. Strutchens & W. Tate (Eds.), *Changing the faces of mathematics: Perspectives an African Americans* (pp. 172-192). Reston, VA: National Council of Teachers of Mathematics.
- Cousins, K. (1995). A path analysis study of the factors affecting mathematics achievement for African American and White third-grade students (Doctoral dissertation, University of South Florida, 1995). *Dissertation Abstracts International*, 56 (04), A1279.
- Hancock Jones, J. & Hancock, C. (2005). *Brown v Board of Education at 50: Where are we now?* *The Negro Educational Review*, 56 (1), 91-98.
- Harris, C. (1993). Whiteness as property. *Harvard Law Review*, 106, 1707-91.
- Harvey, W. & Harvey, A. (2005). A bi-generational narrative on the *Brown vs Board* decision. *The Negro Educational Review*, 56(1), 43-49.
- Johnson, M. (1984). Blacks in mathematics: A status report. *Journal for Research in Mathematics Education*, 15(2), 145-153.
- Kunjufu, J. (1988). To be popular or smart: *The Black peer group*. Chicago, IL: African American Images.
- Ladson-Billings, G. & Tate, W. (1995). Toward a critical race theory of education. *Teachers College Record*, 97(1), 47-65.
- Lattimore, R. (1996). Assessing the mathematical competence of African American tenth graders in preparation for a mathematics proficiency test: A qualitative study. *Dissertation Abstracts International*, 57 (05), 1986A.
- Matthews, W. (1984). Influences on the learning and participation of minorities in mathematics. *Journal for Research in Mathematics Education*, 15, 84-95.
- Monaghan, P. (1993). Critical race theory questions the role of legal doctrine in racial inequity. *Chronicle of Higher Education*, 39 (42), A7-A9.



- Moses-Snipes. (2004). The effect of African culture on African American students' achievement in and perceptions of selected geometry topics in the elementary mathematics classroom. (Doctoral dissertation, University of South Florida, 2004). *Dissertation Abstracts International*, 65, 444.
- National Assessment of Educational Progress (NAEP). (1992). *Executive summary of the NAEP mathematics report card for the nation and the states: Data from the national and trial state assessments* (No. 23-ST03). Washington, DC: U.S. Government Printing Office.
- National Center for Education Statistics (NCES): Digest of Education Statistics. (2003). *Nation's report card: mathematics, race/ethnicity*. Washington, DC: U.S. Government Printing Office.
- National Conferences of State Legislatures (NCSL). (2004). *No Child Left Behind: history*. Retrieved February 1, 2005, from National Conferences of State Legislatures Web site: <http://www.ncsl.org/programs/educ/NCLBHistory.htm>
- Nelson, D. (2002). *PhD attainment in mathematics*. Retrieved May 1, 2005, from Diversity in Science Association Web site: [cheminfo.chem.ou.edu/%7Edjn/diversity/PhDTables/01mathPhD.html](http://cheminfo.chem.ou.edu/%7Edjn/diversity/PhDTables/01mathPhD.html)
- North Carolina Public Schools. (2002). *North Carolina minority achievement report*. Retrieved January 15, 2004, from <http://www.ncpublicschools.org/vol2/rsds2002/index.html>
- North Carolina Public Schools. (2004). *Reports of supplemental disaggregated state, school system (LEA) and school performance in mathematics*. Retrieved November 10, 2004, from <http://disag.ncpublicschools.org/disag/disag-public.jsp>
- North Carolina State Department of Public Instruction. (1963a). Advanced high school students in science, math, will attend special classes at six colleges. *North Carolina Public School Bulletin*, 27 (6), 1.
- North Carolina State Department of Public Instruction. (1963b). Board of education hears progress report on statewide NDEA projects, 1958-1963. *North Carolina Public School Bulletin*, 28 (4), 10.
- National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics*. Reston, VA: Author.
- National Science Foundation. (1993). *Science & Engineering Indicators*. Washington, DC: U.S. Government Printing Office.
- North Carolina Division of Research Department. (1974). [Course enrollment figures]. Unpublished raw data.
- North Carolina Superintendent of Public Instruction. (1952). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1950-1951 and 1951-1952*. Raleigh: Author.
- North Carolina Superintendent of Public Instruction. (1954). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1952-1953 and 1953-1954*. Raleigh: Author.
- North Carolina Superintendent of Public Instruction. (1956). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1954-1955 and 1955-1956*. Raleigh: Author.
- North Carolina Superintendent of Public Instruction. (1958). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1956-1957 and 1957-1958*. Raleigh: Author.
- North Carolina Superintendent of Public Instruction. (1960). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1958-1959 and 1959-1960*. Raleigh: Author.
- North Carolina Superintendent of Public Instruction. (1962). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1960-1961 and 1961-1962*. Raleigh: Author.

- North Carolina Superintendent of Public Instruction. (1964). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1962-1963 and 1963-1964*. (Publication No. 384). Raleigh: Author.
- North Carolina Superintendent of Public Instruction. (1968). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1966-1967 and 1967-1968*. (Publication No. 402). Raleigh: Author.
- North Carolina Superintendent of Public Instruction. (1970). *Biennial report of the Superintendent of Public Instruction of North Carolina: For the scholastic years 1968-1969 and 1969-1970*. Raleigh: Author.
- Oakes, J. (1986a). Keeping track, part 1: The policy and practice of curriculum inequality. *Phi Delta Kappan*, 12-17.
- Oakes, J. (1986b). Keeping track, part 2: Curriculum inequality and school reform. *Phi Delta Kappan*, 148-154.
- Oakes, J. (1990). Opportunities, achievement, and choice: Women and minority students in science and mathematics. In C. B. Cazden (Ed.), *Review of Research in Education*, Vol.16. Washington, D. C. : American Educational Research Association.
- Oakes, J. (1992). Can tracking research inform practice? Technical, normative, and political considerations. *Educational Researcher*, 12-21.
- Patton, M. (1990). *Qualitative evaluation and research methods*. Newbury Park, CA: Sage Publications.
- Reyes, L. H., & Stanic, G.M. (1988). Race, sex, socioeconomic status, and mathematics. *Journal for Research in Mathematics Education*, 19(1), 26-43.
- Smith, C. (2005). Observing the fiftieth anniversary of the 1954 United States Supreme Court school desegregation decision in *Brown v the Board of Education of Topeka, Kansas*. *The Negro Educational Review*, 56 (1), 19-32.
- Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publications.
- State Department of Public Instruction of North Carolina. (1994). *The history of education in North Carolina*. Raleigh: Author.
- Strutchens, M. (1993). An exploratory study of the societal and ethnic factors affecting sixth-grade African American students' performance in a mathematics class. *Dissertation Abstracts International*, 54(06). (University Microfilms No.AAC93-29849)
- Tate, W. (1994). Race, retrenchment, and the reform of school mathematics. *Phi Delta Kappan*, 75 (6), 477-484.
- Tate, W. (1995). School mathematics and African American students: Thinking seriously about opportunity-to-learn standards. *Educational Administration Quarterly*, 31, 424-448.
- Thomas, C.D. (1993). Constructivism and African American students' confidence in mathematics. *Dissertation Abstracts International*, 54 (07). (University Microfilms No. 9335072).
- U.S. Department of Education. (2004). *The facts about...math achievement*. Retrieved November 23, 2004 from <http://www.ed.gov/print/nclb/methods/math/math.html>
- Wiley, E. (1994). Black America's quest for education. *Emerge*, 32, 13-18.

## Appendix

**Table 1 Algebra I Enrollment in North Carolina (Grades 9-12)**

Year	Enrollment
1959-60	56828
1961-62	59174
1963-64	70174
1965-66	Not available
1967-68	69387
1969-70	63467
1970-71	61044

Note. Data gathered from the Biennial Report of the Superintendent of Public Instruction of North Carolina and documents published by the North Carolina Superintendent of Public Instruction. Table 2

**Table 2 Percentage of Students Enrolled in the Mathematics Course Levels Grades 9-12 (NC Public Schools)**

Race	Enrollment	Low	Intermediate	Upper	Year
W	144404	18.1	28.5	11.3	1951-52
B	49474	27.5	29	7.2	1951-52
W	152821	17.8	28	11.4	1953-54
B	53646	30	28.1	6.1	1953-54
W	164074	19.3	32.3	13.4	1955-56
B	58799	28.3	28.3	7.1	1955-56
W	181135	19.6	33.1	15	1957-58
B	63875	30.4	33.8	6.4	1957-58
W	192845	19	32.2	18.2	1959-60
B	68221	28.8	30.4	9.2	1959-60
W	211693	19.4	31.1	18.7	1961-62
B	74181	30.6	28.9	8.3	1961-62
W	238419	18.7	33.6	20.9	1963-64
B	85948	26.7	32.6	12.1	1963-64
W	Not avail.	Not avail.	Not avail.	Not avail.	1965-66
B	Not avail.	Not avail.	Not avail.	Not avail.	1965-66
I	340426	25.3	32.8	13.9	1967-68
I	327382	24.2	27	13	1969-70
I	330325	25.7	29.7	12.4	1970-71
I	332636	24.2	29.2	11.4	1971-72
I	331379	24.8	27.2	10.1	1972-73
I	340633	25.4	28.5	11.6	1973-74
I	Not avail.	Not avail.	Not avail.	Not avail.	1974-80

Note. W-White B-Black I-Integrated

Note. Data gathered from the Biennial Report of the Superintendent of Public Instruction of North Carolina and unpublished records of the Division of Research Department

Note. The enrollment is for all students in the state, not just for the enrollment of students in mathematics classes.

Note. The percentages may not add up to 100.0% because some students elected not to enroll in mathematics classes.

**Table 3 Percentage of Students Enrolled in the Mathematics Course Levels (Grades 9-12) Prior to Integration (White and Black Totals Combined from Table 2) (NC Public Schools)**

Race	Enrollment	Low	Intermediate	Upper	Year
Combined	193878	20.5	28.6	10.3	1951-52
Combined	206467	21	28	10	1953-54
Combined	222873	21.7	31.3	11.8	1955-56
Combined	245010	22.4	33.3	12.8	1957-58
Combined	261066	21.6	31.7	15.8	1959-60
Combined	285874	22.3	30.6	16	1961-62
Combined	324367	20.9	33.3	18.4	1963-64

Note. Data gathered from the Biennial Report of the Superintendent of Public Instruction of North Carolina and unpublished records of the Division of Research Department

Note. Enrollment is the enrollment for all high school students in the state, not just for the enrollment of students in mathematics classes.

Note. The percentages may not add up to 100.0% because some students elected not to enroll in mathematics classes.

**Table 4 Percentage of Students at or Above Level III by Race Algebra I (North Carolina End-of-Course Test Results)**

	2000-01	2001-02	2002-03	2003-04	Average
White	84.6	86.7	86.6	87.6	86.4
Black	57.1	62.6	63.7	65.3	62.2
Difference	27.5	24.1	22.9	22.3	24.2

**Table 5 Percentage of Students at or Above Level III by Race Geometry (North Carolina End-of-Course Test Results)**

	2000-01	2001-02	2002-03	2003-04	Average
White	75.1	78.0	81.4	79.5	78.5
Black	34.8	37.6	42.1	39.9	38.6
Difference	40.3	40.4	39.3	39.6	39.9

**Table 6 Percentage of Students at or Above Level III by Race Algebra II (North Carolina End-of-Course Test Results)**

	2000-01	2001-02	2002-03	2003-04	Average
White	79.7	83.3	85.0	86.1	83.5
Black	52.7	58.1	62.0	62.2	58.8
Difference	27	25.2	23	23.9	24.8

Note. Data gathered from the North Carolina Public School Report of Disaggregated Data (2002, 2004)