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Missing in Action: A Critical Narrative Study of the Absence of Black Female Secondary Science Teachers

Nadia Despenza
Loyola Marymount University, nadia.despenza@gmail.com

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Missing in Action: A Critical Narrative Study of the Absence of Black Female Secondary Science Teachers

by

Nadia Despenza

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Nadia Despenza

Loyola Marymount University
School of Education
Los Angeles, CA 90045

This dissertation written by Nadia Despenza, under the direction of the Dissertation Committee, is approved and accepted by all committee members, in partial fulfillment of requirements for the degree of Doctor of Education.

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Dissertation Committee

Antonia Darder, Ph.D., Committee Member

William Parham, Ph.D., ABPP, Committee Member

R. Nicole Johnson-Ahorlu, Ph.D., Committee Member

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Despite the increasing research that lists cultural incongruence in the classroom among the top factors that speaks to the disproportionate numbers of Black females obtaining STEM degrees there is limited research on the actual number of Black female science teachers at the secondary level in education and the impact this plays on Black females in science, technology, engineering, and math classrooms (STEM). The consequence of all this is that we find ourselves with Black female science teachers "missing in action," and only 5% of Black females receiving a STEM degree. I employ critical pedagogy, critical race theory, and Black feminist thought to answer: (a) What do the stories of Black female secondary science teachers tell us about issues related to their recruitment and retention within the science teaching force? (b) How do Black female secondary science teachers explain the shortage of Black females entering the STEM

field? What do they believe should be done to increase the number of Black females in the field? (c) What contributions do Black female secondary science teachers make or potentially would like to make to increase the number of Black females entering and remaining within the science teaching force? This study explores how Black women are absent in the conversation about recruitment and retention of secondary science teachers. To answer the research questions in a humanizing way, this study was conducted collectively with my participants using the qualitative methodologies of critical narratives and decolonizing methodology. Therefore, this study represents an effort to address this phenomenon by listening to the voices of Black female secondary science teachers and engaging their stories, which often have remained absent from recruitment and retention discussions, to contribute to the scholarship on the recruitment and retention of Black science teachers.

CHAPTER 1

INTRODUCTION

> *The United States' Department of Defense defines military serviceman as Missing in Action (MIA) if " he or she was not at their duty location due to apparent involuntary reasons as result of hostile action and his/her location is not known.*"
>
> --U.S. Department of Defense, 1996, p. 5

I am in love with science. I am a science educator. The unknown intrigues me; I love exploring questions that others would consider impossible to answer. I believe in science as a way of knowing because it is based on logic, evidence, and reasoning (Dembski & Ruse, 2004). However, science is not the only way of knowing; we also learn from our personal and cultural lives. "Camus asserted that we learn more about ourselves and the world from a relaxed evening's perception of the starry heavens and the scents of grass than from science's reductionist way" (Dembski & Ruse, 2004, p. 72). Yet, the other ways of knowing that Camus boasts about rely on opinions, beliefs, lived experiences, and other intersubjective factors rather than on evidence and testing. Knowledge that cannot be quantified scares me and is considered scientifically invalid. However, my college experience taught me that science is not the only way of knowing because the science field is not necessarily just and free from bias.

In the fall of 2010, I learned that science was not the only way of knowing. I was attending a predominantly White undergraduate institution while majoring in chemistry. I called my mom sobbing and said:

> I can't do this anymore. I'm lonely. I'm isolated. No one looks like me in my classes. I want to switch my major in philosophy because I am really good at reading and analyzing

information. I've already talked to a guidance counselor and he said he will support my decision to switch majors.

My mom informed me that my decision was unacceptable because in the real world, a Black female's journey toward achievement is lonely, and it would not get any easier once I graduated. She also bluntly stated that I would not get a job as a philosophy major.

At the time, I did not realize that emotions of loneliness and isolation can interfere with those who consider themselves rational and that not everything can be explained through quantitative data. Before I began college, I loved science and felt prepared for any challenges that would arise. However, once I entered college, I faced a troublesome reality; I felt isolated and academically unprepared. My university was lacking culturally relevant pedagogy; and there was no support system in place for people who looked like me. Not only were there hardly any people of color in my classes, but I also felt that my White professors could not understand my plight.

During my senior year of college, I changed my major to biology and started tutoring young people in middle school and high school science to make money. I realized that I had a passion for teaching science, so I started taking education courses and planned my journey as a science educator. Once again, I called my mom and told her my plan to become a science teacher. And I thought the discussion of changing my major to philosophy was harsh! Well, the discussion about teaching with a science degree was even worse. My mom could not understand why a Black female in today's society would graduate with a science degree and become a teacher. My mom told me I had myriad options that could make me a lot more money. I could become a doctor, a pharmacist, or a researcher in a lab. My mom felt that teaching was beneath

me and that Black females no longer had to be limited to teaching. My mom was concerned about my financial security as a teacher. However, I completed a single-subject science credential and set off to teach science in underserved communities.

Full of vitality, I embarked on my first teaching experience in South Los Angeles, where I would be teaching middle school science to primarily Black and Latino students. My first day was an eye-opening experience. There were no science supplies, and the classroom was dirty. I noticed that the students received low scores on the science portion of their California Standard Tests, and they were disengaged as a teacher lectured in a monotone voice about science. I was determined to make a difference. I met with the master teacher who was supervising my instruction and shared some ideas that I wanted to implement in the science classroom. The master teacher, who was neither Latino nor Black, stated that the students in the Honors class might benefit from the changes, but the other students would never understand science, so it would be a waste of my time.

Through this frustrating initial teaching experience, I realized that the negative experiences I encountered as an undergraduate majoring in the sciences actually started long before I set foot upon the college campus. I realized this problem started in K–12, where I never had a science teacher of color and was often the only Black female in the science honors classes. I came to understand that my voice was lacking not only in the science field but also in the area of science education. Moreover, I came to recognize that Black female teachers of science continued to be absent or "missing in action"—that is, with little expressed concern by the educational establishment for our absence and less knowledge about this persistent phenomenon. Therefore, I knew that my dissertation research had to make a contribution to erasing this

profound silence and constructing knowledge that could support transforming this historical absence. Further, I believe that this research, given my own struggles, can serve as a personally liberating experience and contribute to the Black community in science, technology, engineering, and math, STEM. Moreover, I am tired of hearing scholars who have not experienced my plight as an African American woman in science trying to discuss my experience, without our full presence. As such, I conceive my study as an emancipatory process, rooted in liberation and the voices of the oppressed.

Statement of the Problem

We got everything we wanted but lost everything we had.

– Dr. George McKenna (Personal Communication, June, 2016)

There are a variety of factors influencing the absence and presence of Black teachers in the K–12 teaching profession; and the only way to effectively recruit and retain teachers is to determine the factors hindering them from joining the field. The issues actually date back to the era of segregation. This is to say that, to understand this phenomenon, one must look at the history of education before and after desegregation, the history of education in the Black community, and the current recruitment processes for entering into the teaching profession. Only then can one develop and build an emancipatory strategy to recruit Black teachers in general and more specifically for the science, technology, engineering, and math classroom; and, by so doing, improve the cultural incongruence currently at work within urban classrooms.

On May 17, 1954, U.S. Supreme Court Justice Earl Warren delivered the unanimous ruling in the landmark civil rights case Brown v. Board of Education of Topeka, Kansas. State-sanctioned segregation of public schools was a violation of the 14th Amendment and was

therefore unconstitutional. The NAACP (National Association for the Advancement of Colored People) felt that systematic discrimination had left many Black teachers poorly educated and trained, and Black students were not receiving equal education, compared to their White counterparts (Fairclough, 2000). For example, Black students did not always have access to current textbooks, busses, or classroom materials and equipment. Therefore, the idea of desegregation was highly supported by the NAACP, which worked with political educational leaders to try to ensure equality.

Before the court's ruling to desegregate, Black educators taught more than two million Black students enrolled in segregated schools. There were approximately 82,000 Blacks teaching across the nation (Haney, 1978). After the ruling, there were state laws across the nation that led to the dismissal of Black educators, with or without cause. School leaders believed it was impracticable to use Negro teachers in desegregated classrooms (Haney, 1978). For example, between the years 1967 and 1979 in Alabama, the number of Black principals went from 250 to 40 (Haney, 1978).

In response, the NAACP held to the notion that one must do whatever it took to ensure equality. The NAACP lawyer William Ming argued, "There are fatalities in all social change" (Fairclough, 2000, p. 87). As a result of desegregation, most Black teachers were fired and Black administrators were demoted. Frustrated by this unexpected predicament, historically Black college president H. C. Trenholm remarked, "Being in the field of education and also being a Negro, it seems to me to be tragic" (Fairclough, 2000, p. 91). If Black teachers were not welcomed into the teaching field post Brown v. Board of Education, then how can it be that the

climate following desegregation *not* factor into the exodus of black females from the K–12 teaching profession?

Before desegregation, Black teachers taught history approved by the government, while simultaneously teaching Black history in their classroom. There was a sense of Black pride instilled in Black students in the school setting (Fairclough, 2000). The Black church and the Black community were interwoven. Oftentimes, Black teachers went to the same church as their students and were part of the community. Teachers felt empathy and familiarity with students, which came from being in the same church *family*. The Black preacher from the Black church often taught in the segregated schools or was the main administrator (Fairclough, 2004). Ambrose Caliver, who represented the cause of Blacks inside the U.S. Office of Education during the 1930s, stated, "In the hands of the Negro teachers rests the destiny of the race" (Fairclough, 2004, p. 50). The Brown decision, although opening the door for integration, also inadvertently undermined the traditional place of the school in Black society (Fairclough, 2004). Desegregation eroded opportunities formally available for the Black community leaders to have a stake in Black education. This led to a cultural incongruence because the Black community no longer was fully integrated in education directly. How could the Black community support teaching as a profession, when they were no longer connected to the education system or could not participate actively within a supposedly integrated educational process, almost entirely controlled by the dominant culture?

Frequently, to avoid hiring Black teachers, administrators would use teacher competency tests to determine that Black teachers were not qualified. During the era of desegregation, the test results, unfortunately, were evaluated differently based on race (Haney, 1978), leading to the de

facto exclusion of Black teachers. In today's society, one of the factors that contributes to the low number of Black teachers entering the education field is the competency pass rate (King, 1993). According to Graham (1987), Black teacher education students do not score well on teacher competency tests because they are not receiving an equitable education. Poverty, too, affects the pool of qualified Black teachers (Graham, 1987; King, 1993).

The *U.S. News* (2015) reported:

> Black children are far more likely to live in households that are low-income, extremely poor, food-insecure, or receiving long-term welfare support. As such, they are less likely than their White peers to live in households where at least one parent has secure employment. Similarly, black children are more likely to live in homeless shelters, than any other population. Nearly 25 percent of [B]lack parents report their children live in unsafe neighborhoods, compared with 7 percent of [W]hite parents. (para 18)

The ruling of Brown vs. Board of Education might have provided an ostensibly equal education system, but did it provide a more equitable education system? How can Black student teachers pass teaching competency tests when they may be contending with uncertainty related to safety, housing, employment, or food?

The last contributing factor that plays into the absence of Black teachers is that those who do graduate from college now have a variety of options that appear more intriguing than the teaching profession (Graham, 1987; King, 1993). The history of Brown vs. Board of Education, moreover, greatly influenced the perception of becoming a teacher in the Black community.

> "Teaching used to be one of the few professions that black college graduates could aspire to and make decent money," said LaRuth Gray, who is scholar in residence at the

> Metropolitan Center for Research on Equity and the Transformation of Schools at New York University. "But as the county integrated and other professions opened their ranks, education lost its cachet and fewer black students thought about becoming teachers," she said. (Holland, 2014, p. 2)

Hence, this begs the question: Is the cultural incongruence or disconnect from education the reason that other professions appear more intriguing to the Black community?

The process of acceptance into the teaching profession is also made more difficult by the systemic racialized oppression that desegregation was intended to eradicate. Writing as his alter ego Geneva Crenshaw, Derrick Bell (1987) suggested that Brown vs. Board of Education might have been motivated more from the self-interest of White elites than from a genuine desire to help young Black children, given that a society based on racism has little incentive to dismantle an oppressive system that benefits them. Bell called to task the real beneficiaries of the law, in that the law resulted in the closure of Black schools, the dismissal of Black teachers, and the demotion of Black principals. Bell argued that the real tragedy of Brown v. Board of Education was that Black teachers became the unintended victims of desegregation. Thus, understanding the historical context and cultural implications of the decision—through a critical decolonizing lens—can be integral to explaining why so many Black female teachers are "missing in action."

Racism Justified by Science

> Racial determinism was the form taken by the advancing wave of the science of culture, as it broke upon the shores of industrial capitalism. It was in this guise that anthropology first achieved a positive role alongside of physics, chemistry, and the life sciences, in the support and spread of capitalist society. (Marvin Harris, 1968)

To interrogate why Black female science teachers are missing in action, we need to examine not only the historical implications of Blacks in education, but also the historical implications of science with respect to African Americans in this country. The experience of Black female educators in education is different than White educators, given the historical, cultural, and political differences of their lived experiences in America. A Black female science educator has to address racism and prejudice not only in the educational context, but also in the field of science. This is so in that, historically, science has been used to perpetuate the bigoted notion that deems Blacks intellectually and morally inferior to Whites.

Scientific racism has blurred the line between what is fact and what is fallacy, which has led to the marginalization of others so that those at the top can maintain their power. In 1664, British natural philosopher Robert Boyle tried to make sense of color and race. In his work, he described a practical joke by a 17th-century scientist in which White visitors enter a laboratory and are asked to wet their skin with spit and add a white compound, silver nitrate, to it (Yale, 2016). Much to the White visitors' dismay, their skin turns black, as if it has been colored with ink (Yale, 2016). This "trick" paved the way for Boyle's experimental studies on race and demonstrated how easily science can be used as a ruse to lie to others (Yale, 2016).

It is extremely dangerous when psychology and the sciences are used to justify racism (Guthrie, 2004). The Cambridge Anthropological Society intentionally sought out studies on racial variances (Guthrie, 2004). In those studies, anthropology with psychology justified intellectual differences among human beings by race (Guthrie, 2004). In the late 17th century and early 18th century, Darwin's theory of evolution was falsely used to substantiate racializing scientific claims that hierarchized races, positioning Whites as superior to all and Blacks at the

bottom of the taxonomy (Watkins, 2001). Linnaeus created a racial classification stating that "negro" belonged to the lowest division of mankind from an evolutionary standpoint (Guthrie, 2004). Fredrick Blumenback, whom Gould (1996) considered the founder of anthropology, claimed that cranium variation in the external shape of the skull proved that Whites were superior because it reflected the shape of brain underneath. Gould performed a well-reasoned assessment of the errors in Blumenback's claim and argued that scientific racism was used for the sociopolitical and political entrapment of Blacks. In the 1960s, Henny Garrett expanded on Blumenback's claim and concluded that the average Black man's brain was smaller; therefore, they were more primitive than Whites (Guthrie, 2004).

Scientists, such as Blumenbach, Haeckel, Linnaeus, White, and many others, in fact, classified Blacks in the same category as chimpanzees and monkeys (Watkins, 2001). Polygenists went as far as to say that not only were Blacks inferior to Whites, but that Blacks were also an entirely different species—a species related to apes (Watkins, 2001). This so-called scientific notion was reinforced by one of our founding fathers, Benjamin Rush. Rush, a signer of the Declaration of Independence, believed Blacks were infected with the pathogen leprosy, which caused them to be mentally instable and sexually immoral (Watkins, 2001). Physician Dr. John H. van Evrie used science to justify slavery, asserting, "Even the animal kingdom recognized Negro inferiority and said that a hungry tiger was more likely to prey on Blacks than [W]hites" (as cited in Watkins, 2001, p. 29). Cartwright argued that the Africans were diseased and could not handle the responsibilities of freedom and if they tried to escape that they should be put down (Loggins, 2016). Historians and scientist contributed to the idea of Blacks being inferior; because they were not even human, they deserved their oppression.

Scientific racism also gave birth to the eugenics movement. According to Farrall (1985), "Eugenics is the science which deals with all influences that improve the inborn qualities of a race; also with those that develop them to the utmost advantage" (p. 55). Eugenics was employed to justify the politics of separatism, and therefore Blacks' inferiority to Whites; hence, mixing Black and White genetic alleles would prove problematic, in that it would permit the Black race to survive. So common were these ideas to the history of the United States that it was not until the 1954 ruling of Brown v. Board of Education that "scientific" racism was officially denounced (Watkins, 2001).

Despite the legal victory of the Brown decision, nonsensical deterministic views of superior/inferior heredity persisted throughout the 20th century. One example of the persistence of this perspective can be found in the controversial book *The Bell Curve*, which asserts that intelligence is inherited and that social inequality can best be explained by the IQ test results between races (Herrnstein & Murray, 1994). Even as recent as 2014, Nicholas Wade, in his book *Troublesome Inheritance: Genes, Race, and Human History,* claimed to have applied scientific reasoning to substantiate that some races are more creative or intelligent than others. He argued that people from tribal societies in Africa tend to be impulsive and quick to consume, while Europeans are good at accumulating, given their thoughtful, forward-thinking natures. The sciences historically have been used to suggest that Blacks are culturally depraved, the ruin of an elitist civilization, defective and hypersexual (Guthrie, 2004). In essence, the argument is a sophisticated version of the same proclivity to use scientific claims to substantiate disempowering perspectives about race.

So, how can we expect that, in 2018, Black females would feel welcomed in the science field? To truly create an emancipatory recruitment process for Black female science educators, the case has to be made that Blacks' science education journey in America is different; therefore, we need a different recruitment process created by us for liberation. We need a dissident voice that speaks against the fixed ideas that are accepted as truths by society that negatively impact the marginalized efforts toward a more just society (Darder, 2011).

Absence of Black Female Science Teachers

By 2024 minority students will represent 54% of the public-school system, and yet 84% of all teachers in the public schools are White females (Lavadenz & Hollins, 2015; National Education Association [NEA], 2014. This misalignment causes cultural incongruence and negatively impacts the academic performance of all students. Cultural incongruence experienced by members of two opposing cultures can create miscommunication, behavioral misunderstandings, and misinterpretations inside the classroom (Delpit, 2006). If teachers represent the nation's racial, ethnic, and linguistic cultures and effectively incorporate culturally relevant pedagogy into their classrooms, research has shown that this enhances all students' academic achievement and is specifically advantageous to the academic performance of students of color (NEA, 2014).

I have also noted earlier from personal experience that the majority of my Black friends —both male and female—who received their teaching credentials eventually left the K–12 teaching classroom, including myself. Black teacher attrition, then, is also a problem, because once they leave, they seldom return. Currently, minority teachers leave the profession at a higher rate than nonminority teachers. Between the years 2002 to 2011, schools lost roughly 1 in every

3 Black teachers (NEA, 2015). However, and surprisingly so, there is no research to be found that provides solid evidence related to the current percentage of Black female science teachers in general or those who teach at the secondary level.

In 2014 the National Science Board reported that African American females were awarded only 5% of all science and engineering degrees, and of the degrees awarded, only 3% were physical science degrees (National Science Foundation [NSF], 2014). I went to a predominantly White institution ranked among the top 50 schools in America and graduated with a bachelor of arts in biology. When I graduated with my biology degree, I was the only African American female to graduate with this degree in my class. The issue of African American students falling behind or representing a low percentage of students in the science field has been of concern for more than a decade.

Hence, the percentage of African Americans in the science field is still staggeringly low when compared to their White counterparts. More recently, there is increasing research that speaks to the disproportionate numbers of Black females in STEM (Hanson, 2007; Parsons, Foster, Gomillion, & Simpson, 2008; Pringle, Brkich, Adams, West-Olatunii, & Archer-Banks, 2012) and cultural incongruence is listed among one of the top factors. There is also a correlation among culture incongruence, teachers' perception of Black students, and whether Black students feel welcomed and at home in the science classroom (Brown, 2005; Green, 2008; Hanson, 2007; Parsons et al., 2008; Pringle et al., 2012). Moreover, African American students represent only 8% of natural science degrees awarded in the United States (NSF, 2014). Yet, despite an obvious absence, there is limited research on the actual number of Black female science teachers in K–12 education and the impact this plays on Black females in STEM.

The consequence of all these circumstances is that we find ourselves with Black female science teachers missing in action, and only 5% of Black females receiving a STEM degree (NSF, 2014). This creates a Catch-22 situation, whereby, to increase the number of Black females obtaining a STEM degree, we would need to have more Black female STEM educators to counteract the cultural incongruence in the STEM classroom. And, to become a STEM educator, one most likely needs a STEM degree, thus creating two problems that are inherently linked. This study is precisely an effort to address this phenomenon.

Research Questions

I am a Black female interested in increasing the number of Black females that enter secondary science education by exploring the dichotomy between Black teacher recruitment and retention in America's education system and the percentage of Black females receiving a Bachelor's in STEM. Tothis end, the research questions that drive this study are:

1. What do the stories of Black female secondary science teachers tell us about issues related to their recruitment and retention within the science teaching force?
2. How do Black female secondary science teachers explain the shortage of Black females entering the STEM field? What do they believe should be done to increase the number of Black females in the field?
3. What contributions do Black female secondary science teachers make or potentially would like to make to increase the number of Black females entering and remaining within the science teaching force?

Purpose

There is an absence of Black teachers' voices and a need to examine the science teaching force's recruitment of Black teachers from their own perspectives. This study seeks to promote a shift in how we think of the teacher recruitment process by providing a place for Black science teachers to voice their perspectives in ways that can move us toward creating a more just and emancipatory recruitment process. A more just recruitment process can lead to more Black female teachers entering the field, and therefore potentially increase the number of Black females entering and remaining within the science teaching force.

Theoretical Framework

Three major conceptual lenses, all consistent with the intention of this study, were utilized for the evolution of this study. These included Black feminist thought, critical race theory, and critical pedagogy. In tandem, these three perspectives provided a useful theoretical direction, along with specific principles for analysis that assisted me to effectively glean from my data salient recommendations and conclusions.

Black Feminist Thought

Are we a lost generation of our people?

Add us to equations but they' ll never make us equal

She who writes the movie owns the script and the sequel So why ain' t the stealing of my rights made illegal?

They keep us underground working hard for the greedy But when it' s time pay they turn around and call us needy

My crown too heavy like the Queen Nefertiti

Gimme back my pyramid, I' m trying to free Kansas City

Mixing masterminds like your name Bernie Grundman

Well I' mma keep leading like a young Harriet Tubman

You can take my wings but I' m still gonna fly . . .

– Janelle Monae (2013) Q.U.E.E.N

The term ***Black woman*** is defined as "a person with dark skin who comes from Africa and an adult female person—as opposed to man" (Black woman, n.d.). The example associated with this definition is ''the woman kept house while the man hunted" (Black woman, n.d.). In 2016, the President of the United States is on record stating "Grab her by the pussy," and "All lives matter." So, what does that mean for the people at the intersection between race and gender? Lorde (1985) stated

> I am a Black Feminist. I mean I recognize that my power as well as my primary oppressions come as a result of my blackness as well as my womaness, and therefore my struggles on both of these fronts are inseparable. (p. 4)

When she said these words, she was speaking about the double oppression that Black women experience at the hands of sexism and racism. This dissertation explores the voices of Black female science educators, and since Black woman cannot deny their race any more than can they deny their gender, I must address the oppression due to Blackness and patriarchy.

Black feminist thought works under the premise that Black women experience both sexism and racism and because of that they live in a state of double discrimination: the double jeopardy of race and gender discrimination (Crenshaw, 1989; King, 1988). Elizabeth Cady Stanton (1860) stated, "Prejudice against color, of which we hear so much, is no stronger than

that against sex" (as cited by King, 1988, p. 43). That is not to say that Black women's experiences are greater than White women's experiences; they are just usually silenced (King, 1988). Anna Julia Cooper, the fourth African American woman to receive a doctorate degree, and Mary Church Terrell, the first president of the National Association of Colored Women, noted that Black women are handicapped with both the oppression of race and the oppression of being a woman (King, 1988).

Collins (2000) stated that Black women have unique perspectives on their own oppression based on their political and economic status. Class creates a triple jeopardy—racism plus sexism plus classism (King, 1988). This unique experience is a different reality for others and requires a Black feminist consciousness (Collins, 2000). Although, this unique experience requires women of color's perspective and stories to be incorporated in feminism, they are often overlooked in feminist theory, and White women speak for women as a whole, which ignores the role of race (Crenshaw, 1989). Crenshaw asserted, "Black women are caught between ideological and political currents that combine first to create and then to bury Black women's experiences" (p. 160).

This conundrum results in the silencing of Black women's voices and experiences while White women's experiences are elevated above the rest. Therefore, we cannot separate the issue of race from sex or sex from race (hooks, 1982). Black feminist scholars argue that all oppression must be addressed (King, 1988). With this in mind, hooks (1982) argued that every movement in America—from its earliest beginning to the present day—has been built on a racist foundation. This includes the women's rights movement, in which White women only sought equality for themselves thus maintaining the political ideology of racist acts whereby White

women became oppressors (hooks, 1982). For liberation to occur, there has to be a critical examination of the intersection of racism, sexism, and classism. Neither Black liberationist politics nor feminist theory can ignore the intersectional experiences (Crenshaw, 1989; King, 1988).

Although, there is not a uniform experience among all African American women, the challenge for all feminist thinkers is to analyze the different structures of oppression that affect Black women (Collins, 2000). The ideas and actions of Black women force a rethinking of the concept of hegemony (Collins, 2000). The motto has to be "when they enter, we all enter" (Crenshaw, 1989, p. 167). Crenshaw means that Black females voices must be included in discussions of feminism and racism. However, Black feminist thought requires not only including Black women within an already established analytical structure, but also the restructuring of concrete policy.

Because the Black female experience varies, it is imperative to hear the voices of Black females from different racial, class, and sexual identity makeups. Furthermore, Crenshaw (1989) argued that not including Black women in racial discourse or feminist discourse forces Black women to live in an intersection between the two. So, we must embrace all of their experiences to create an emancipatory recruitment and retention strategy rooted in liberation for Black women teaching in science. Only then can liberation occur because we acknowledge the power that is situated in Black women's experiences (Collins, 2000).

Critical Race Theory

The critical race theory (CRT) movement is a direct outcome of a "collection of activists and scholars interested in studying and transforming the relationship among race, racism, and

power" (Delgado & Stefancic, 2012, p. 1). Delgado and Stefancic (2004) argued that racism is so deeply embedded in American culture that it is barely identifiable in today's society. Thus, to address the educational inequities, researchers must explore how race impacts African American teachers, students, and communities. DeCuir and Dixson (2004) asserted that CRT is an effective way to do this, in that CRT seeks to dismantle hegemonic practices by giving the counterstories of the oppressed a place to heard, recognized, and integrated into the process of educational change (Bell, 1987; Ladson-Billings, 2000). To counteract the hegemonic structures of control that lead to conditions of disempowerment and silence within the Black community, one must acknowledge and forthrightly engage with the fact that racism exists in America. To that end, I employed CRT within the context of education (DeCuir & Dixson, 2004).

Derrick Bell (1987), often noted as the father of critical race theory, has used narratives to make sense of the human experience, as it pertains to race. This framework requires that the counterstories of people of color be at the center of one's work, instead of remaining silenced at the fringes (Delgado, 1995). CRT in education, then, works to expose racism and propose the kind of radical solutions and actions that social justice work requires (Ladson-Billings, 2000). More specifically, Ladson-Billings and Tate (1995) have argued that school inequity is based on three central tenets:

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 (p. 48).

Based on these assumptions, CRT in education challenges the hegemonic ideologies and practices that promote and support a variety of microaggressions and racial inequities in the classroom. To better understand the absence and retention of Black females in science education within this study, my analysis engaged with the intersection of race, culture, gender, and power supported by CRT. This conceptual lens allowed me to analyze and engage with conditions of structural inequalities within the education field, as expressed within the narratives that were collected for this study. I accomplished this by critically engaging the counterstories of marginalization as expressed in the stories of Black female science teachers.

Critical Pedagogy

Critical pedagogy engages questions of power in ways that speak directly to the material conditions and human needs of subaltern communities. It is a tradition rooted in the importance of history, which engages the authority of lived experience as vital to the process of social change. As such, critical pedagogy counters the hegemonic epistemological tradition of Western positivism (Darder, Baltodano, & Torres, 2009). As such, a primary aim of critical pedagogy and its decolonizing intent is to create counter-hegemonic intellection spaces and instill a fundamental epistemological shift that will produce an emancipatory body of knowledge capable of transforming the world (Darder, 2015).

For this study, I focused on the critical principles that speak to that historicity of knowledge and cultural politics, as these are linked to the presence and absence of Black female teachers in science education, which signals challenging existing asymmetrical relations of power within the context of science education. More specifically, according to Darder et al. (2009), the critical principal of cultural politics is understood as a cultural struggle between those

who are privileged and those who are marginalized. Historically, schools have embraced theories that dehumanize and sustain the systemic structures that oppress people (Darder et al., 2009). Therefore, critical pedagogy calls for those hegemonic structures to be challenged and for a re-evaluation of knowledge shaped by privilege, power, politics, history, and culture (Darder et al., 2009). Critical pedagogy builds on the other two frameworks, which focus on womanhood and race to help rename the world for Black women in education.

Critical education challenges the notion that education provides equal opportunity for all (Darder et al., 2009). Critical education operates under the assumption that schools actually work against the oppressed to maintain the structures to maintain economic interest of few. To deny that one is out of the system would be a lie because education is political (A. Darder, personal communication, 2015). To understand education, one has to acknowledge how social order shapes how students and teachers are perceived (Darder et al., 2009).

According to Darder et al. (2009), the historicity of knowledge, within this same critical tradition, refers to the notion that we are all subjects of history; therefore, we must take into consideration the accounts of injustice that have been produced by humans. Knowledge is created within a historical context and gives life to every human experience. For that reason, we must bear in mind the historical tensions that inform educational practice and acknowledge that all knowledge must be understand as historical (Darder et al., 2009).

Inherent to any study that employs a critical pedagogical lens, one must refute the dominant ideology of oppression to rename the world. This entails the need for critical engagement with cultural, historical, political, and economic conditions that perpetuate structural inequalities (Darder, 2015; Darder et al., 2009). To understand why Black female teachers are

"missing in action" in education, for example, one has to examine the historical, political, and cultural implications that play a role in their absence. Their absence in the field, as explained earlier, is categorized in this study as "missing in action" because their whereabouts are unknown, and the underlying assumption is that this is not due to chance alone. Hence, I will make a case that systemic oppression has contributed to their removal and continuing absence. I argue that if we want Black females to rejoin the teaching field, we must start by listening to their voices regarding their experiences with the issues of recruitment and retention by hearing their critical narratives.

Antonia Darder (2015) argued, "all knowledge [must be] understood as both historical and contextual, where often the reification of knowledge renders historical events or states of affairs as permanent, natural and commonsense phenomenon" (p. 64). For example, as discussed earlier, the Brown vs. the Board of Education decision had direct ramifications for the Black teaching force , which in turn had an impact on the education of the Black community. However, a critical understanding of the historical consequences of the decision can help us better understand why Blacks are "missing in action."

Moreover, Darder (2015) posited, "Theories of schooling and society here are understood as fundamentally rooted in assimilative official transcripts of society, generally governed by the interests of the wealthy and powerful" (p. 65). Hence, to truly understand the absence of Black female science teachers in America, one has to understand the power dynamics of marginalized voices through critical research. The intent of critical pedagogical research is to construct emancipatory knowledge by challenging dominant policies and practices through the knowledge and wisdom of the voices of subordinate populations (Darder, 2015; Darder et al., 2009).

Additionally, through an exploration of Black female educators' perspectives with a CRT lens, Black feminist lens, and critical pedagogy, this study aimed to consider emancipatory possibilities for recruitment and retention, as experiences and imagined by Black female science teachers, based on their lived histories in the field. I contend that without these voices Black female teachers will continue to experience an unwelcoming climate within science, denied opportunities to name their own experience. Hence, this study is vital to counteracting the systemic oppression that has resulted in Black females in education—and specifically in science education—missing in action.

Methodology

This study employed a qualitative methodology, in that it is an approach that allows for engaging with the nuances and subtleties of human experience (Flick, 2014). Consistent with this methodological approach, data were collected through the use of a critical narrative method that is founded upon a critical lens that recognizes the inherent relationship between culture and power (Darder, 2012). Also, in sync with the theoretical frameworks that inform this study, the critical narrative method lends itself to a decolonizing process for collecting counterstories and centering the voices of the Black women participating in this study. Bell (2002) argued that narratives allow researchers to understand experiences and to realize that culture is at the heart of the stories people share. I selected six Black female secondary science teachers—novice to veteran—and juxtaposed their individual narrative sessions against my own personal story. Dixson and Rousseau (2007) argued that the dominant social group, to sustain its racial and class privilege, has often used illogical narratives that normalize racism and oppression, thereby silencing the stories of the oppressed.

In contrast, it was imperative in this study that I listened and engaged the voices of Black science teachers as members of a nondominant group whose counterstories have generally remained silenced or missing from the dominant discourse of science education. Hence, I interviewed each participant for approximately 90 minutes. I recorded each session and then transcribed the information. Once transcribed, I conducted a 1-hour follow-up member-checking session to help guarantee accuracy of the transcription. I coded and decoded the data by dividing the data into categories and subcategories consistent with my conceptual framework and the literature in the field, in an effort to identify significant themes and issues raised by participants. This provided clarity and enhanced my understanding of key issues and experiences (Stringer, 2008).

To combat the silencing of the stories of the Black women as oppressed subjects, I used a decolonizing methodology built upon the belief that all humans must participate actively in producing meaning (Darder, 2015). Decolonizing interpretive design is meant to generate new insights from those lived experiences and create a systematic political shift in practice and theory (Darder, 2015). The aim of this methodology is to not only create new theory but serve as a tool for critical bicultural researchers to actively listen to those deemed as others. The only way to understand the experiences of Black female secondary science educators is by examining their history and listening to their voices. Moreover, as Darder (2015) has affirmed, critical bicultural researchers

> are keenly aware that their bicultural voice is also inherently tied to the collective voices of their communities—historically subordinated by genocide, slavery, colonization, and

imperialism to conserve the political and material interests of a domestic and internationalized economic apartheid. (p. 73)

Significance of the Study

The contributions of this study would be of interest to education policy makers who want to address the fact that the teacher population does not currently mirror the student population. This study aims to support emancipatory recruitment and retention practices and policies that will help increase the number of Black teachers entering the field. This study engages the voices of Black female science teachers, which have often been absent from recruitment and retention discussions, to contribute to the scholarship on the recruitment and retention of Black teachers.

Positionality

I am a Black, heterosexual, female science educator who has lived in the United States for most of my life. I was raised in the South, but I spent the majority of my teenage and adult life in Southern California. Prior to this research, I received a Bachelor of Science degree, and I have worked as a science educator in both underserved and privileged communities. Along the way, I have heard stories from Black educators who shared their struggles with racism, prejudice, and classism within their field. I have also heard stories of Black educators being discouraged from entering the education field by their parents and friends due to lack of pay and prestige. I have never had a Black science teacher, male or female, in my educational career. For most of my career as a Black science educator, I have not had a peer who looked like me. I have always felt the burden of supporting Black and Brown students in the science classroom to help counteract the societal stereotypes that might occur in science due to racism.

I entered into this study with the hopes of developing an emancipatory recruitment process that will help increase the recruitment and retention of Black female science educators. An emancipatory recruitment process would help reduce the cultural incongruence in the science classroom for Black females, which would indirectly act as a catalyst for more Black females to obtain STEM degrees. Most importantly, I hope to explore and come to better understand the missing in action phenomenon through the voices of Black female science teachers.

Delimitations and Limitations

A delimitation of this study is that all of my participants identified as Black women, and they are were high school science teachers. A limitation of this study is that it was a small sample size of six participants. Another limitation is that I used narratives as my sole method and made the assumption that my participants were telling their truth.

Definition of Key Terms

Black feminist thought (BFT): Theoretical framework that asserts that Black women experience both sexism and racism because they live in a constant state of double discrimination: the double jeopardy of race and gender discrimination (Crenshaw, 1989; King, 1988).

Critical race theory (CRT): Theoretical framework in education that exposes racism and proposes radical solutions for equity in education (Ladson-Billings, 2000).

Missing in action (MIA): When a military service man or woman is not at their duty location due to apparent involuntary reasons as result of hostile action and his/her location is not known" (Department of Defense, 1996).

Recruitment. A "range of strategies to attempt to equalize the supply of and demand for teachers" (Earley & Ross, 2006, p. 9).

Retention. A long-term teacher investment issue that schools must deal with to keep their teachers (Earley & Ross, 2006).

STEM. Science, technology, engineering, and math.

Organization of Dissertation

The research for this dissertation is presented in five chapters. Chapter 1 provided an introduction into this study, which examined why Black female science teachers are considered "missing in action" by addressing the issues of recruitment around the lack of Black female secondary science educators. I discussed the approach that I used to engage their voices, which are currently missing in academia, to help explain the shortage of Black females entering the STEM field and give a basis for what they believe can be done to increase the number of Black females in the field. Similarly, the study addresses retention of Black female science teachers, which is indirectly related to recruitment. I explained that I employed Black feminist thought, CRT in education, and critical pedagogy as my theoretical frameworks, given the historical, cultural, and political dynamics that have been constructed in the U.S. education system to promote racist ideology and oppression.

In Chapter 2, I examine how recruitment and retention strategies are implemented for White teachers and juxtapose these strategies against Black teachers. I examine the literature for the voices of Black teachers around recruitment and retention. Currently, there are no data readily accessible on the percentage of Black female science teachers in America. Therefore, it will be crucial to examine all the literature there is around recruitment and retention of Black female teachers.

In Chapter 3, I discuss my methodology for using narratives of Black females to tell their own stories of their experiences with recruitment, as well as a decolonizing approach to interpreting the narratives. Narratives, both a phenomenon and method, create a negotiation of the story between my participants and me (Clandinin & Connelly, 2000). Gough argued that narratives are an emancipatory practice because, through stories, we give meaning to ourselves and others (as cited in Webster & Mertova, 2007). I was intentional about capturing the voices of the participants in their own voices. It is critical to use their own language because the cultural voice is key to the liberation of Black females (hooks, 1994), and thus respect for this voice is central to creating recruitment processes that are genuinely inclusive.

In Chapter 4, I descriptively present the profiles and critical narratives of the Black female science teachers who participated in this study. The chapter concludes with a delineation of the major themes and issues voiced and a brief presentation of similarities and differences in the narratives of study participants.

In Chapter 5, I provide a systematic analysis of the major themes voiced by the participants in their narratives to provide clarity and help enhance the understanding of key issues and experiences (Stringer, 2008). This discussion developed in such a way that it led to grounded recommendations for an emancipatory recruitment process wherein Black female science educators will no longer be missing in action.

CHAPTER 2

LITERATURE REVIEW

Black Teacher Recruitment and Retention

If teaching our young in schools becomes a lifelong professional career—adequately rewarded and supported; with decision-making authority commensurate with responsibilities—teacher shortages would fade away.

– John I. Goodlad, 2002, p. 48

When public school originated in the 1630s, the only criterion to become a teacher was the ability to read and write (Mulvey & Cooper, 2009). It was not until the late 1800s that formal teacher education training became instituted in higher education. Historically, the education field emerged as a male-dominated profession, in which males often used the teaching profession as a stepping-stone to careers that had higher pay and provided them more opportunities for advancement (Mulvey & Cooper, 2009). Since females were not afforded the opportunity of higher education during the 1800s, those who entered the field were mostly teenagers and, thus, poorly trained. Consequently, most teachers left when they got married to raise a family and uphold the traditional patriarchal family structure (Mulvey & Cooper, 2009).

In the 1840s, Secretary to the Massachusetts Board of Education Horace Mann, often considered the first great American advocate for public education, believed that public education was deteriorating and was in grave need of reform (Cremin, n.d.; Mulvey & Cooper, 2009). In response, he advocated educational reform based on six principles:

- The public should no longer remain ignorant;
- Education should be paid for, controlled, and sustained by an interested public;

%# Education will be best provided in schools that embrace children from a variety of backgrounds;!

&# Education must be nonsectarian;!

'# Education must be taught by the spirit, methods, and discipline of a free society; and!

(# Education should be provided by well-trained, professional teachers.!

Mann's main focus was to significantly improve public education by focusing on better-equipped school houses, teacher recruitment, and teacher preparation (Cremin, n.d.). The goal of teacher recruitment for Mann was to increase the number of teachers to meet the demands for the number of students entering public school (Cremin, n.d.). Mann, thus, focused on recruiting teachers and teacher preparation. Accordingly, teacher training schools were created to train teachers for the classroom. The liberal arts college was used to train secondary teachers (Cremin, n.d.). In the 20th century, educational theorist and researcher John Goodlad (2002) argued that teaching was still not considered a profession, largely due to the fact that 2 years of training was not enough to constitute a profession (Mulvey & Cooper, 2009). This concern, not surprisingly, was followed by years of teacher accountability schemes and high stakes testing in education.

In 1897, most states only required teachers to get a state certificate, which consisted of basic skills, such as U.S. history, geography, spelling, and grammar (Mulvey & Cooper, 2009). Mulvery and Cooper (2009) noted that in the early 19th century, it was only necessary to convince a local school board of one's character and moral standing to be hired as a teacher, and some states did not even require a candidate to pass any sort of admittance test; general knowledge sufficed. However, the 20th century ushered in a growing fascination with science

and, thus, a belief in the need for more standardization of teacher preparation and, similarly, standardized testing for students (Mulvey & Cooper, 2009).

As educators and state officials grew more concerned about what they perceived as a decline in teacher quality, the politics of accountability began to gain a greater foothold in the arena of teacher preparation. Angrist and Guryan (2004) noted:

> Beginning in the 1960s, states began testing prospective teachers in a direct effort to ensure that teachers meet minimum standards for basic skills and subject knowledge. By 1999, 41 states required applicants to pass some sort of standardized certification test. (p. 241)

In conjunction with mandatory testing of prospective teachers was the increase in in teaching credentials, particularly within public schools. Angrist and Guryan wrote,

> For example. In 1971, over two-thirds of public school teachers had a B.A/, while only 27 percent had a master's degrees or educational specialist's degree. By 1991, however, over half of public school teacher (52.6 percent) had a master's degree or education specialist's degree. (p. 241)

The 1983 *A Nation at Risk: National Commission on Excellence in Education* report issued by the Reagan administration contributed to a growing shift toward even more structures of accountability in teacher education. Teacher preparation moved away from training approaches that taught prospective teachers to engage in a classroom that was focused on the whole child, even though research had proven those approaches to be effective (Evans & Leonard, 2013). Instead, they began to focus primarily on "evidence-based" student achievement because America was failing to compete academically with other industrialized nations

(Cochran-Smith, 2004; Evans & Leonard, 2013). As a repercussion, teacher education began to focus on teacher thinking, knowledge and teacher learning–content knowledge, and pedagogical content. Moreover, the renewed emphasis on both the testing of prospective teachers and teacher credentialing can also be linked to a variety of national standards-based school reform efforts that led to the 1994 amendments surrounding the federal reauthorization of the Elementary and Secondary Education Act of 1965, which added "the requirement that states adopt standard-based reform" (Barton, 2001).

The 1990s solidified the standards movement through the standards-based practices required by No Child Left Behind (NCLB) legislation. The move toward standardization of teacher and student knowledge was an outgrowth of conservative fears that claimed that the U.S. public school system could not complete internationally. According to Klein (2016), the standards movement:

> significantly increased the federal role in holding schools responsible for the academic progress of all students. And it put a special focus on ensuring that states and schools boost the performance of certain groups of students, such as English-language learners, students in special education, and poor and minority children, whose achievement, on average, trails their peers. (para. 1)

This increasing federal control of education reinforced the conservative ideology of the *Nation at Risk* report and led to NCLB's policies that focused on student outcomes and teacher accountability.

In turn, teacher preparation began to focus more rigorously on outcome-based assessment (Evans & Leonard, 2013). Praxis examinations, meant to measure teacher candidate's knowledge

and skills, became a basis of admission to teacher education. It is worth noting that Madkins (2011) considered this mandatory testing of prospective teachers a key reason for the decline of Black teacher candidates, while Mulvey and Cooper (2009) pointed to the attachment of teacher preparation to 4-year baccalaureate degrees as partly responsible for the decline (Mulvey & Cooper, 2009). Educational historian, Diane Ravitch (as cited by Mulvey & Cooper, 2009), contended:

> Our nation faces a daunting challenge in making sure that we have a sufficient supply of well-educated, well-prepared teachers for our children. There is surely widespread agreement that good teachers are vital to our future. However, there is not widespread agreement about how we accomplish this goal. Some propose that we raise standards for entry into the teaching profession, while others suggest that we lower unnecessary barriers. (p. 1)

Moreover, in a study on testing and teacher education, Angrist and Guryan (2004) concluded that there is "no evidence that testing hurdles have raised the quality of new and inexperienced teachers" (p. 246). Moreover, they argued that this "lack of effect on quality is a special concern" (Angrist & Guryan, 2004, p. 246), given the negative repercussions testing has on racial representation in teaching. There is no question then that the politics of high stakes accountability that began in the late 20th century has not only reshaped education and teacher preparation but may also have contributed to the "missing in action" phenomenon of Black female science teachers.

Where Are the Black Teachers?

The people currently coming out of ed schools simply aren't diverse enough.

– Ceronne B. Daly, 2016, para. 14

During the Great Recession of 2007–2009, teachers across the country faced layoffs and pay cuts where nearly 300,000 teachers and other school personnel lost their jobs (Evans, Schwab, & Wagner, 2014). The National Council on Teacher Quality (as cited by Evans et al., 2014) conducted a study throughout 41 of the largest school districts in the nation that examined the rate of change in teacher salaries over 4 school years (2008–2009 through 2011–2012). In 80% of the districts, the teachers had experienced a total pay freeze or pay cut. Likewise, over the course of those 4 years, 95% of the districts froze or cut at least one component of scheduled teacher raises, through step increases and/or annual adjustments (Evans et al., 2014). Furthermore, myriad layoffs and mass distribution of reduction in force slips affected morale and led to psychological and moral consequences for the teaching force (Goldhaber, Strunk, Brown, & Knight, 2015).

In their study, Goldhaber et al. (2015) examined the indirect effects of "teacher layoffs on teacher mobility by measuring changes in teacher responses to layoff-induced job insecurities for teachers with varying characteristics and who are embedded within schools and districts with contrasting policy contexts" (p. 34). In one of the largest school districts (LAUSD), 4,876 teachers received a reduction in force (RIF) notice between the years of 2008 to 2009. Of those who received RIF notices, only 1,356 actually lost their job, but the threat of potentially losing their jobs greatly affected the teaching force. During the following school year, 2,181 LAUSD teachers received RIF notices, although only 355 teachers were actually laid off and 143 were

not rehired or did not return the next school year. By the 2010–2011 school year, nearly 87% of LAUSD teachers had received an initial RIF notice, but over 60% of teachers who received a layoff notice were retained. This retention was partly due to the LAUSD unions using federal stimulus funds from the American Recovery and Reinvestment Act. The Goldhaber et al. (2015) study demonstrated that when teachers receive an RIF notice, it wreaks havoc, as teachers are shuffled (or shuffle themselves) across schools. The threat of being laid off or being forced to move between schools to keep their jobs had indirect repercussions on teacher morale, which also affected the stability of the teacher workforce, not to mention the measurable impacts on teacher salaries.

Although Goldhaber et al. (2015) reviewed a variety of data tied to the layoffs, they unfortunately did not examine the data with respect to the issue of racialized inequalities. However, more recently in Chicago, similar layoff conditions prevailed, with African American teachers hit hardest: Of the 347 tenured teachers laid off in 2012, 51% were African Americans, although African American teachers make up less than 30% of the city's teaching workforce (Sawchuk, 2012). In response to the disproportionate layoffs of Black teachers by Chicago Public Schools, the Teachers Union filed a suit for discrimination against the school district to bring attention to the retention struggle of Black teachers, specifically under layoff conditions. On another note, as the economy began to pick up, fewer Black high school graduates were choosing to pursue teaching credentials and education programs.

With more career opportunities to choose from and careers with more prestige, millennials picked careers that offered higher salaries and greater financial stability (Goldhaber et al., 2015). These decisions, combined with the increase in high-stakes standardized testing and

teacher accountability, led to the decline of teacher education program enrollment across the United States. For example, in California, enrollment in 2015 was down 53% over the past 5 years as well as in New York and Texas (Westervelt, 2015). However, this phenomenon is not new. In an earlier study on who chooses to teach and why, Hanushek and Pace (1995) concluded, "Blacks are more likely to train in fields other than teaching" (p. 109).

The problem of teacher recruitment and retention, then, is most abysmal for teachers of color. On top of a national shortage of teachers, the elementary and secondary educator workforce is also overwhelmingly White (U.S. Department of Education, 2016). The report, ***The State of Racial Diversity in the Educator Workforce***, cited that, in 2012, 73% of students who majored in education were White (U.S. Department of Education, 2016). In juxtaposition, the racial composition of the students in the United States is becoming more diverse. For the first time, the K–12 student population in the United States is less than 50% White, non-Hispanic (Wells, Fox, & Cordova-Cobo, 2016).

Furthermore, the U.S. Department of Education (2016) reported that 71% of those students majoring in education at the master's level were White. One reason for this offered by Gay (2000) is that education colleges and particularly preservice and in-service programs are tailored to meet the needs of White female teachers, leaving out the needs of all teachers of colors. Furthermore, Agee (2004) problematized that "teacher education texts used in the course made recommendations for using diverse texts or teaching diverse students based on the assumption that preservice teachers are White" (p. 749). The silencing and representation for Black female teachers is an even more severe problem. hooks (1994) noted that Black female teachers have historically been silenced in the discourse of teaching and learning due to the

double jeopardy of being a woman and Black. Even though teaching has often been viewed as "women's work," Black women teachers and their experiences have often been left out of the discussions—even when race was the topic of discussion (hooks, 1994).

Although more people of color are now obtaining bachelor's degrees—with Black females representing the most educated group in the United States in 2016, according to the National Center for Education Statistics (2015)—they are not choosing to pursue teaching credentials and degrees (U.S. Department of Education, 2016). Furthermore, the decline in the number of Black and Hispanic students majoring in education is sharper than the overall decline in education majors (NEA, 2016). Therefore**,** some school districts are deliberately trying to hire teachers from underrepresented racial groups. Speaking to this question, Ceronne B. Daly (as cited by Rich, 2015), Director of Diversity at Boston Public Schools, contended that the recruitment strategies being used are not sufficient to increase minority teachers. These current recruitment strategies include college scholarships for K–12 teachers, signing bonuses, loan forgiveness, financial awards for excellent teaching, grants, federal salary subsidies for teaching in "hard-to-teach" geographic areas, and support of research on the connection between teacher preparation and K–12 students (Berry, 2008; Earley & Ross, 2006; Rich, 2015).

The National Teacher Association (2016) believes minority teachers are experiencing a variety of issues that are pushing them out of teacher education, including licensure tests that screen out minorities disproportionately, inadequate schooling that leaves some minority students ill-prepared and unmotivated for higher education, and standardized testing with cutoff scores that excludes minority students from higher education, teacher training, and teacher certifications programs. These issues must be addressed to increase the numbers teachers of color

in the field because students need a multicultural education to be culturally competent in a multicultural workplace. With increasing evidence that diversity makes us smarter, it is important to develop fully a diverse teacher workforce so all students can experience the passion and plurality that teachers of different backgrounds bring to the classroom (Evans & Leonard, 2013).

To this end, the NEA (2016) has made it their mission to increase the number of ethnic minority teachers with the following strategies:

- Early prospective teacher identification initiatives through secondary school surveys, counseling, motivational workshops, summer college preparatory courses, courses in educational theory and practice, and promise of financial aid.!
- Aggressive recruitment activities, such as holding orientations, recruiting transfer students from 2-year colleges, sponsoring future teachers' clubs, organizing media campaigns in minority communities, and recruiting minorities to teaching from business and the military sectors!
- Financial aid, including fellowships, scholarships, and forgivable loans, targeted to minority students who intend to teach.
- Social and economic support, including improving test taking skills and providing academic counseling and tutoring.
- Mentoring in the school setting.
- Community Learning through America's Schools Initiative—especially in shortage math and science
- Conducting a national forum on the issue of educator recruitment and retention

Black Teacher Recruitment

Given that the Black teaching force in the United States has dropped significantly, the question becomes, what is the nation's commitment to developing the Black teachers we know we don't have but say we need?

– Irvine and Fenwick, 2014, p. 136

Research on the positive academic implications for Black students to have Black teachers is growing exponentially. Villegas and Irvine (2010) have supported that there are academic benefits to having teachers of color and of the same cultural background. In their study, Stewart, Meier, LaFollette, and England (1989) researched the question: "Does having African American educators impact African American students' school success?" Their findings highlighted the importance of having African American teachers in desegregated schools for the following reasons:

- Fewer African Americans were placed in special education!
- Fewer African Americans were suspended or expelled!
- More African Americans were placed in gifted and talented programs!
- More African Americans graduated from high school!

Gershenson, Holt, and Papageorge (2016) found that non-Black teachers have significantly lower educational expectations for Black students than do Black teachers. In their study, they found that Black teachers were 12 percentage points less likely to expect black students to complete a 4-year college degree (Gershenson et al., 2016). Moreover, Meier, Wrinkle, and Polinard (1989) concluded that "African American teachers are without a doubt the key" (p. 6) to Black student academic success.

Furthermore, research shows that increasing a school's percentage of Black math teachers had a significant effect on the number of Black students that subsequently enrolled in rigorous math courses (Klopfenstein, 2005). That is not to say that Black teachers should only teach Black students or that Black students should only have Black teachers. In fact, Leonard's (2008) research concluded that all teachers, regardless of race, could be effective with any students.

However, minority teachers can often bring a unique understanding of their cultural backgrounds to the classroom, which enhances student experiences. As such, they are more likely to build positive relationships with their students (Villegas & Lucas, 2004). Furthermore, Black teachers play an important role in being positive role models for Black students (Evans & Leonard, 2013). Even with the growing research on the positive impacts of having a diverse teaching staff, Black teachers still only represent 8% of the teaching force (Irvine & Fenwick, 2014; U.S. Department of Education, 2016). For Byrd & Singh (2014), this phenomenon is attributed, in part, to leaks in the teacher preparation pipeline and the only way to improve African American student success in teacher education programs is to improve the delivery of our recruitment and retention practices.

Issues most cited by educational researchers (Byrd & Singh, 2014; Gordon, 2000; Podgursky, Monroe, & Watson, 2004) as prohibiting African Americans from entering the field of teaching include:

- College entrance exams!
- Teacher pipeline issues (fewer Black students graduating from high school, the population of eligible African American teachers drops)!
- Historically Black colleges and universities' declining enrollment

- Praxis teaching test
- African American students who *do* enter colleges and universities find themselves with career choices that have higher prestige and financial remuneration, such as physicians, engineers, etc.

College entrance exam and bias. The very origin of college entrance exams was intended to create a distinction between the haves and have-nots. In 1905, French psychologist Alfred Binet developed a standardized test of intelligence, which was then adapted into an aptitude test given to U.S. servicemen to assign jobs during the war effort during World War I (Fletcher, 2009). Following the military's decision to use aptitude tests, the College Board developed a test to assess math and verbal skills, the Scholastic Aptitude Test (SAT) (Fletcher, 2009). However, it was not until the late 1930s that the College Board agreed to use a standardized test as a common admission practice, and by the end of World War II, standardized admission tests became a standard rite of passage for any college-bound high school senior trying to be accepted into postsecondary education (Fletcher 2009; Lemann, 2004).

Currently, universities use the SAT and ACT as a predeterminer for college acceptance. However, Lemann (2004) has noted that the original goal of implementing the SAT nationwide was to develop a test that identified the most intellectual students and not to assess traditional knowledge. Therefore, this test is explicitly designed not to be an achievement test, which measures knowledge, but instead a tool for class segregation and a way to maintain power for the elite (Lemann, 2004). Thus, the SAT was intentionally designed to limit the number of individuals pursuing a bachelor's degree, producing a disparate impact—a given practice that on face value appears neutral and is not applied with discriminatory intent, yet has a discriminatory

effect (Lemann; 1999). However, critics of the SAT argue that there is statistical evidence to suggest that the test is culturally biased against minorities. According to Jay Rosner, Executive Director of The Princeton Review Foundation, the test questions selected are comprised of those that White students will answer correctly more frequently than minorities (Young, 2003).

Despite the controversy surrounding the potential biases of standardized tests, the majority of colleges across the United States list SAT or ACT scores as an admissions requirement, thereby preventing some low-scoring students from even considering college as an option. College entrance exams are a barrier for many young people of color, especially those from low-income backgrounds, because they do not always have access to resources that help them prepare for these exams. Freedle (2003) found that the SAT has been shown to be both culturally and statistically biased against African Americans, Hispanic Americans, and Asian Americans. Freedle's study had many critics who believed that his methods were flawed, but a 2010 article by Santelices and Wilson argued that Freedle's findings were sound. They found that the SAT proved to be biased against the African American minority group because the SAT used vocabulary that was more familiar to White test takers.

It is unfortunate enough that the education system is inequitable for underserved communities, but the college entrance exams—clearly biased against Blacks—present another key barrier for Black students who want to become teachers. Aguinis, Culpepper, and Pierce (2010) found that the methods used by the College Board and other measurements for admissions or employment testing may be flawed. Aguinis et al. (2010) implied that these tests have the potential to be biased but could not conclude that the admission tests are biased. Rosner (2012) analyzed the 276 verbal and math questions from the 1998–2000 SATs and

discovered that the experimental questions that Black students answered correctly—referred to as "Black questions"—were not incorporated into future tests.

However, the SAT experimental questions that White students answered correctly *were* included on future tests (Rosner, 2012). Therefore, Rosner (2012) argued that the questions were geared toward White test takers and recreated a norm that White is "right," which promoted the subliminal message that Whites do better than their peers. This has led to a system where Black culture is not valued in America, but White culture is seen as what others aspire to be. In the words of Robert Schaeffer, former Public Education Director of FairTest, "That's incredibly culturally centered. You don't see a regatta in center-city L.A., you don't see it in Appalachia, you don't see it in New Mexico" (Pringles, 2003, para 12).

Moreover, there are achievement gaps in SAT and ACT test scores that are highly correlated with family income and wealth (Fairtest.org, n.d.). For example, the average composite score in the ACT in 2005 for students from families whose income was $18,000 or less was 17.9, while students from families whose income was above $100,000 scored 23.5 on average (Jaschik, 2005). This financial inequality is also mirrored in the SAT test. Cheryl O'Brien, Founder of Test Prep Specialists, believes that wealthy students have a major advantage on college entrance tests because they can spend months or even years preparing for the test with private teachers (Brock, 2015).

There is even research about gender bias in the SAT and ACT. According to Kessel and Linn, who summarized more than a dozen studies of large student groups and colleges, such as MIT, Rutgers, and Princeton, young women typically earn the same or higher grades as their

male counterparts in math and other college courses despite having SAT-Math scores 30-50 points lower (as cited in FairTest, n.d.).

Teacher pipeline. "A diverse teacher workforce isn't just a nicety—it's a real contributor to better outcomes in our schools, workplaces, and communities," former Secretary of Education John B. King Jr. said (U.S. Department of Education, 2016). ÒThe State of Racial Diversity in the Educator Workforce,Ó(2016) report found that the teacher pipeline is affected by the following:

- While bachelor's degrees are almost always a prerequisite to entering the teaching force, bachelor's degree students are less diverse than high school graduates. Thirty-eight percent of bachelor's degree students were students of color, compared to 43% of public high school graduates.
- Students of color are underrepresented in teacher preparation programs. Students of color made up 38% of the postsecondary student population, but only 25% of those enrolled in teacher preparation programs.
- Bachelor's degree completion rates for students who major in education are lower for black and Hispanic students than White students. The completion rate gap between Black and White bachelor's degree students majoring in education is approximately 30 percentage points (73% vs. 42%) and the completion rate gap between Hispanic and White education majors is more than 20 percentage points (73% vs. 49%).
- The teaching workforce is overwhelmingly homogenous (82% White vs. 2% Black males)

Furthermore, Byrd & Singh (2014) posited that the teacher pipeline, which consists of recruitment strategies, retention strategies, and graduation and certifications, has leaks, which contribute to the deficit of Black teachers. Smith (1988) maintained that teacher pipeline issues are not only related to deficit thinking, but also to fallacies and victim blaming of Black students for their inequality and inequity in achieving a postsecondary education. Smith explained that fallacies, such as "Blacks do not want an education," "Blacks would rather work than pursue an education," "No one knows what works to better the pipeline," and "Colleges who want to attract Blacks to education are doing Blacks a huge flavor," are not true. Byrd & Singh argued that the recruitment of African Americans should start with the identification of students in high schools and community colleges who exhibit the qualities of great teachers—compassion, patience, and commitment to social justice—and who display an interest in the profession. After these students have been identified, they must be counseled on the admissions, financial aid, and matriculation procedures for educator preparation programs.

It has been shown that the demographics of students pursuing education can be transformed by using recruitment programs that focus on the early identification of talented, diverse, preservice teaching candidates, with a concerted retention effort that addresses the unique needs of low-income, first-generation students (Byrd & Singh, 2014). Smith (1988) suggested that we should expand the target pool for undergraduates, help change the orientation of Blacks toward a career in education, recruit more Black faculty and staff to colleges of education, and attach the economic success of college of education administrators and their staffs to their Black student base.

Research also shows that pipeline issues for African American students entering the teaching profession include the failure to be admitted to college, the failure to transition from community college, the failure to perform, the failure to become engaged, and the failure of teacher tests (Byrd & Singh, 2014). Cohen and Brawer (2008) found that racially and/or ethnically underrepresented students comprised 36.5% of community college enrollments—a 20% increase from the enrollment two decades earlier. Furthermore, many African Americans use community college as a channel to higher education. However, there are several barriers preventing them from obtaining a bachelor's degree, including familial commitments or financial hardship (Lewis & Middleton, 2003).

Thus, any recruitment strategy that fails to address the unique needs of community college students will not adequately promote access for diverse populations (Byrd & Singh, 2014). In addition, Smith (1988) argued that if we do not fix these leaks in the teacher pipeline

> in the next two decades, there will be a smaller percentage of Black teachers (not to mention Black civil servants and even Black industrial (technicians) unless we do something now to open the pipeline of Black students to higher education and to teacher preparation. Funneling large numbers of Blacks into low-level service occupations only structures more racial inequality into our future. (p. 170)

If we want to see more Black teachers in the future, we will have to radically rethink our recruitment strategies and identify preK–12 students with an interest in teaching before they reach college. If we closed the completion rate between White and Black education majors, we could add another 300 Black bachelor's degree completers for every 1,000 Black aspiring teachers (U.S. News, 2015). The fallacy that we do not know what works is not true because in

the 1970s, 50% of all Blacks who obtained doctoral degrees obtained them in the field of education (Thomas, 1981).

Declining enrollment of historically Black colleges and universities. One of the issues cited as contributing to the lack of Black teachers is the declining number of Black students enrolling at historically Black colleges and universities (HBCUs). Sixteen percent of all Black teacher candidates attend HBCUs (U.S. Department of Education, 2016). Starker-Glass, Mariella-Walrond, Watson, and Scott (2014) argued:

> Teacher education programs within HBCUs are invaluable, as they are on the forefront of two endeavors, they are the top producer of Black teachers nationwide, and the experience of the Black student and Black teacher are the reality on and near HBCUs. (pp. 232–233)

HBCUs serve as the largest producers of Black students with higher education and advanced degrees (NCES, 2012). Arne Duncan (2009) even stated, "HBCUs have produced roughly half of all African American professionals and public school teachers" (para 9). Traditionally, the main goals of historically Black institutions were to become a resource for building human, social, and economic capital in the Black community, as the two most popular professions of graduates were teachers and clergymen (Starker-Glass et al., 2014).

Mary McLeod Bethune founded Bethune-Cookman University (BCU) in 1904 with the following three things: $1.50, her faith in God, and five little girls (Starker-Glass et al., 2014). In 1941, the Florida State Department of Education approved a 4-year degree program in liberal arts and education at BCU, which focused on teacher preparation for Black women (Starker-Glass et al., 2014). Starker-Glass et al. (2014) conducted a study at BCU, where they surveyed

alumni to provide an in-depth account of their experiences in education. They asked the questions: "How did your academic experience at BCU impact your preparation for current teaching practice?" and "What is the historical and present relevance of BCU in the preparation of 21st century teachers of color?"

Starker-Glass et al.'s (2014) study concluded that the alumni felt supported by faculty who held high expectations for them. They had a community that supported them, and they felt culturally competent, which is what prepared them to be 21st-century teachers of color. One participant of the study stated, "The locations of most HBCU's were established in low-income areas and preservice teachers completed their hours in low-income schools. The settings were not always ideal but prepared preservice teachers for any and every kind of situation" (Starker-Glass et al., 2014, p. 239). Hence, HBCUs have played a significant role in recruitment, including teacher preparation, support on exams, and retention. They also have helped to cultivate a diverse teaching force who serve in high-need areas, where they dispel myths, serve as role models, and focus on the whole child (Irvine & Fenwick, 2014).

Praxis/teaching test. The Praxis examinations—the basis of admission to teacher education—are a major reason for the decline in Black teacher candidates (Madkins, 2011). Throughout the United States, teacher hopefuls cannot complete their undergraduate degree program or get a license or a job if they fail some portion of the certification tests. This failure also brings the financial burden of having to stay in school longer and the need to retake the failed sections of the tests (Barmore, 2016). Moreover, Darling-Hammond (2000) has argued that Praxis tests do not even predict teacher effectiveness and are not valid measures of teacher preparation. Her findings echo those of Angrist and Guryan (2004) mentioned earlier.

To combat the negative effects of this test on potential Black teacher candidates, HBCUs began offering Praxis test preparation to improve the pass rates for Black students. The U.S. Department of Education's report (2010), *Recent Trends in Mean Scores and Characteristics of Test-Takers on Praxis II Licensure Tests,* states that across all the teacher preparation tests, White candidates have higher mean scores than African American candidates. In 2009, among first-time test takers, only 40.7% of African Americans passed the reading section, 44.2% passed the writing section, and 36.8% passed the math section. In comparison, 81.5% of first-time White test takers passed the reading section, 79.5% passed the writing section, and 78.2% passed the math section (Nettles, Scatton, Steinburg, & Tyler, 2011). Unless direct attention is paid to the teacher examinations and requirements, the gap between Black teacher education students and White teacher education students will remain unchallenged.

Prestige and financial burden. Recruitment efforts must encourage Black students to enter the field and provide the financial support to help them. Gordon's (2000) qualitative study of African American teachers found that African Americans viewed the teaching profession as unattractive for a number of reasons. First, the salary for a teacher is low in comparison to the education that was required to join the profession (Gordon, 2000). Second, they noted a lack of educational support on testing certifications for teaching. And third, they felt there was a lack of encouragement by teacher faculty (Gordon, 2000). Some of the participants even cited racist behavior by education faculty as a deterrent to entering the teaching field (Gordon, 2000). Ladson-Billings (2005) stated that the teaching profession used to be considered a stable and high-status job for the African American middle class, but that is not the case anymore.

Recruitment efforts must not only encourage and welcome Black students, but also provide financial benefits that exceed the debt required to obtain the teaching credential.

Alternative Teacher Recruitment

Graduation from a university with a bachelor's or master's degree and teaching certification is not the only way to become an educator. There are several alternative teacher recruitment methods that allow candidates to enter the teaching profession in urban schools. The alternative programs allow candidates to teach with temporary certificates, while earning a master's degree in education and initial certification (Evans & Leonard, 2013). Some examples of those programs are New York City Teaching Fellows and Teach for America. In 2002, the fast track program New York City Teaching Fellows had approximately 19,000 applicants and accepted approximately 2,500 applicants into the program based on selection qualifications, which included a GPA of at least a 3.0 and passing of a standardized test (Mulvey & Cooper, 2009). To help recruit, programs like these offer scholarships for teaching training and college courses, a stipend for cost of living, and a first-year teaching salary during the 2-year stint in the program (Evans & Leonard, 2013).

These alternative education programs have received praise for tapping into a different pool of teacher candidates—which includes older career changers and minority teacher programs—and creating a fast track for teachers to be placed in underserved communities (Evans & Leonard, 2013). However, these programs have also been criticized for being a quick fix, placing teachers in the classroom with little to no experience, and have shown minimal success in recruiting Black teachers to work in urban schools (Madkins 2011). There are indeed some great ideas for recruitment with these alternative methods; however, substantial changes would

need to be made for them to become more inclusive of Black teachers and more effective with teacher preparation.

Science Teacher Recruitment

The diminishing pool of science teachers has been a pressing problem since Reagan's era of a Nation at Risk (Luft, Wong, & Semken, 2011). Yet, "research on decisions to teach science and early recruitment experiences in science education is relatively sparse" (Luft et al., 2011, p. 462). Coble, Smith, and Berry (2009)—researchers on the recruitment and retention of science teachers—and Ingersoll (2001) have argued that retention practices cause the shortage of science teachers rather than recruitment practices. However, Luft et al. disagreed, stating that issues in recruitment are what cause the diminishing pool of science teachers, since that is the entry point for teachers. They argued that one must examine why teachers enter the force to understand the complex issue of teacher shortages in science.

As such, one solution to the science teacher shortage has been the development of programs that recruit more teachers into the profession (Luft et al., 2011). Abell et al. (2006) found that alternative certification science education programs spark interest in science majors to pursue careers in science education. The programs range from precollege experiences to college teaching apprenticeships that encourage students to consider teaching. The programs usually include financial incentives that cover the cost of educational coursework and create science education pathways. Luft et al. argued that these methods do not work because financial incentives serve as temporary distractions and not permanent solutions, and these do not take into account if a person is even suited or committed to a profession in education. These programs

are good at quickly filling gaps in the field, but they ought to be about identifying teachers who are student-focused, have a love of teaching, and inspire life-long learners in science.

This is mirrored in the study by Luft et al. (2011), in which science majors who moved into the education profession became disheartened when their students failed to engage in lectures and became frustrated with principals because of their focus on testing. The novelty of being a teacher wore off for those students, and they left the field as a result. Luft et al. also argued that programs targeting graduate science teacher assistants—in hopes that they will enter the education field after graduation—do not work. A number of programs specifically target graduate-level science students to take part in teacher apprenticeship programs, which they hope will spark an interest in teaching. However, these teacher assistants solely work with undergraduates and only for two or three courses a week. This is but a small glimpse of what a teacher in K–12 experiences on a daily basis, unlike the traditional teacher who teaches five classes a day with 30 to 40 students per class.

Researchers strongly believe that policymakers must understand that the recruitment of science teachers is about more than quickly filling open teaching positions (Luft et al., 2011). They have to come to the realization that science education is a complex process, and student learning and engagement must be the end goal. Furthermore, if we want a nation where STEM innovation thrives and is competitive on a global scale, we will need to make sure our science teachers are prepared and excited to teach the next generation of diverse STEM learners.

Recruitment Shortage: Fact or Fiction?

Ingersoll and May's (2011) report, *Recruitment, Retention and the Minority Teacher Shortage for the Consortium for Policy Research in Education*, "examines and compares the

recruitment and retention of minority and [W]hite elementary and secondary teachers and attempts to empirically ground the debate over minority shortages" (p. i). The authors found that only 16.5% of all elementary and secondary teachers were minorities. Ingersoll and May concluded that this phenomenon was not due to a failure of teacher recruitment, but rather in teacher retention.

In the 1980s, the number of minority teachers actually outpaced the growth of White teachers, resulting in a more diverse teaching force. So, what happened? Ingersoll and May (2011) showed that minority teachers departed at higher rates than White teachers, citing career advancement or job dissatisfaction as the leading causes. They even mentioned the plethora of initiatives to increase the number of STEM teachers and how ineffective they were at fixing the problem (Ingersoll & May, 2011). Data actually suggest that there are more than enough qualified STEM teachers, but the United States is not retaining them in the classroom. Moreover, Ian Adair, Executive Director at the Martinez Foundation, which works to address the problems that minority teachers face once they start teaching, also believes that retention instead of recruitment should be the focus, especially for STEM teachers (Lodaya, 2013). Adair's reasoning is that, to recruit more minority teachers, we must improve the retention of the existing minority teachers because they will influence the potential minority teachers (Lodaya, 2013). When examining the missing-in-action phenomenon, one must also determine why so many Black female science teachers have left the field, rather than solely focus on recruitment strategies. Understanding both these areas of concern is central, then, to this study on the absence of Black science teachers.

Black Teacher Retention

Meeka's teachers used to always tell her that staring at the clock would only make time move slower. Now grown up and a teacher herself, Meeka couldn't help glaring at it as if it were responsible for how bored she was listening to Mrs. Brown painstakingly review the senseless rubric her group would be assessed with. Seemed like white teachers needed a manual to even breathe. Meeka looked at the clock again. She spotted Mrs. Brown heading toward her table to 'check in.' Attempting to look busy, Meeka doodled on her agenda sheet: Thirteen years, two months, three days, and twenty-two minutes until retirement.

--Pamela Lewis, 2016, para. 1

One in five teachers quit annually, resulting in an ever-changing teacher pipeline (Evans & Leonard, 2013). Darling-Hammond (2007) has posited that retaining teachers is a far larger problem than recruiting new ones, and retention is directly related to the working conditions of the educator. The cost of teacher attrition results in a loss of two billion dollars annually or about $15,000 per recruit who leaves the field (Darling-Hammond, 2007). Earley and Ross (2006) contended that not having a clear distinction between recruitment strategies and retention strategies is also a major problem. They argued: "

> There is an assumption embedded in federal and some state actions that retention policy can actually serves recruitment tool. We suggest that is wrong because finding and hiring someone to take a teaching job is essentially a labor issue, while teacher retention is an investment issue. (Earley & Ross, 2006, p. 23)

Earley and Ross insisted that a clear distinction be made because recruitment is a labor issue that requires a quick response—even commenting that a quick response could be as quick as three

days. Retention, on the other hand, is a long-term investment and must be universally available, and not just in wealthy districts.

Attrition and Retention Factors

Moore (2012) has maintained that the factors that influence attrition for teachers are high-stakes testing, the retrenchment of tenure, and increased pressure to improve student outcomes. Darling-Hammond (2007) stated that salary disparities between those teaching the neediest students and those teaching in wealthier districts cause frustration among teachers, leading to attrition. They add that teaching conditions—such as class sizes, specialists, and equipment—and the lack of coaching also contribute to the ever-revolving door of teachers entering and leaving the field. Berry (2004) posited that the factors that influence retention are access to good principals and skilled colleagues, small class sizes and student loads, high-quality professional development, and classroom resources necessary to help students meet high academic standards. Overall, Berry (2004) and Darling-Hammond (2007) have contended that working conditions matter the most to attrition and retention.

Retention is particularly difficult in urban school settings. Ingersoll and May (2011) noted that urban schools are more likely to face organizational challenges. Likewise, urban school settings often have a higher percentage of students from socially economic marginalized backgrounds (Kokka, 2016). Yet, the research has shown that people of color are two to three times more likely to choose to teach in urban schools that serve students of color (Ingersoll & May, 2011; NEA, 2015). Minority teachers who work in urban settings are usually assigned to schools with large populations of children from low-income families, subjected to student

discipline problems, face a lack resources, receive lower salaries, and are assigned a more top down, scripted curricula (Rich, 2015).

Consequently, Ingersoll and May (2011) argued that these organizational and retention issues in urban settings cause minority teachers to resign more than their White counterparts, making their retention necessary to resolving urban teacher shortages (Ingersoll & May, 2011). In his interview in the article, "Why Teachers of Color Quit," and in response to the question, "Where are the teachers of color?," Ingersoll (2001) noted that minority teachers are hard to retain because of the burnout and frustration caused by on-the-job hazards, such as poor working conditions, discipline problems, spreading school violence, and a lack of support from colleagues (as cited in Machado, 2013). Rich (2015), in agreement with Ingersoll, noted that minority teachers also experience frustration with management and list the lack of autonomy as reasons why they quit. Further, salaries are low for teachers compared to salaries for other professionals, which lowers the prestige and social value of a career in teaching for many potential minority teachers.

African Americans made up 6.8% of the teaching workforce in the 2011, down from 8.3% in 1990 (Rizga & Lewis, 2016). According to the U.S. Department of Education (2016):

> Every two years, the U.S. Equal Employment Opportunity Commission (EEOC) collects the labor force data on behalf of itself and the Department's Office for Civil Rights on employees' job category, sex, and race from public elementary and secondary school districts with 100 or more employees. (p. 27)

These data represent a small glimpse into the teaching workforce and also provide information on new hires. The data show that while Black and Hispanic teachers made up 8% and 9%,

respectively, of all classroom teachers in 2014, they were not evenly distributed across geographic areas. Black and Hispanic were predominantly working in urban areas. Twelve percent of teachers were Black and 13% were Hispanic in urban areas, but in rural areas, Black and Hispanic teachers made up only 6% and 5%, respectively, of all classroom teachers.

Data compiled by Ingersoll (2001) show that Black teachers have a higher turnover rate than in any other demographic. This contrasts the turnover rate for White teachers, which has remained stable at 15% since the 2008–2009 academic year. More specifically, the turnover rate for Black teachers went from 19% in 2008 to 22% in 2013 (Rizga & Lewis, 2016). According to the Albert Shanker Institute (2015), which is funded in part by the American Federation of Teachers, the number of Black educators has declined sharply in some of the largest urban school districts in the nation. In Philadelphia, the number of Black teachers declined by 18.5% between 2001 and 2012. In Chicago, the Black teacher population dropped by nearly 40%; in New Orleans, there was a 62% drop in the number of Black teachers (Rizga & Lewis, 2016).

According to Rizga and Lewis (2016), many of these departures are attributed to mass layoffs and closings in schools with low-test scores, given the current era of accountability. Vast numbers of Black principals, Black teachers, and Black noncertificated staff have been displaced—all in the name of raising achievement among black students: meaning that 26,000 African American teachers have disappeared from the nation's public schools—even as the overall teaching workforce has increased by 134,000. To hold on to teachers of color, educational leaders and policymakers must become better aware of the attrition factors that impact teachers of colors, as well as their unique experiences and perspectives.

Climate for Black Teachers

Kohli (2016) asserted that critical race theory is a useful analytical tool in understanding the hostile racial climates of schools. Education and educators often view the world through a lens that sees Whiteness as property. To combat that ideation, we must recognize that schools—historically and currently—have not been structured to serve communities of color (Kohli, 2016). Therefore, the voices of teachers of color are often Ò missing in actionÓ from education discourse because teachers have been degraded, and must stand up against cultural biases and racism. Kohli has expressed the belief the only way to heal from the wounds of our own education is to fight against oppression and name the world.

KohliÕs (2008) analysis of nine female teachers of color revealed that the racism teachers of color were exposed to in schools took a toll on their well-being, growth, and retention. Teachers of color experience racial microaggressions, colorblindness, and racism (Kohli, 2016). Milner and Woolfolk Hoy (2003) argued that because they are underrepresented and racialized, Black teachers are susceptible to stereotype threat in their professional lives. Black teachers feel a responsibility to challenge stereotypes about Black students, which leads to an unattainable goal and threatens their self-efficacy as teachers. Therefore, Kohli stated that, to recruit teachers of color, we need to reframe the culture of Whiteness in schools and enact a paradigm shift to effectively train and support their specific needs. Furthermore, if we do not shift the focus from high-stakes testing and create a space more humanizing that acknowledges the strengths and struggles of those in the building, we are setting up both our students of color and teachers of color for failure.

Burdens That Impact Black Teacher Retention

> *Black teachers represent a small fraction of the workforce nationwide, but it's not because they can't or don't want to teach. They face racial discrimination and stereotyping that leave them feeling alienated and restricted from participating in the school community, impacting their ability to be effective and ultimately their desire to remain in the profession. Despite their feelings of alienation, they take on extra responsibilities and are often assigned additional duties because of their unique strengths, leaving them burdened.*
>
> --Griffin & Tackie, 2016, p. 11

Black teachers in the course of their everyday lives in U.S. schools often face a variey of unspoken expectations, obligations, and distortions, which are not necessarily faced by their White counterparts. These racializing conditions associated with their labor can create extraordinary stressors that can lead to disillusionment with their profession. The following speaks to some of the major burdens Black teachers face, which often can be associated with their dissatisfaction and decision to leave teaching.

Burden of Accountability

> *Whenever reformers go into communities of color, they often seek images of failure, and if a black teacher has been in this underserved 'failing' school for a few decades, they are viewed as a part of the problem.*
>
> --José Luis Vilson, as cited by Rizga and Lewis, 2016, para. 101

Chris Emdin, Associate Professor of Education at Columbia University and author of ***For White Folks Who Teach in the Hood . . . and the Rest of Y'all Too***, posited that many Black

educators enter the profession because they had a bad school experience themselves, and they want to be a better teacher than the teachers they had. Unfortunately, many of them end up disillusioned, leaving the profession because they feel that they are forced to become the kind of teachers they resent (Rizga & Lewis, 2016). Emdin stated,

> They say, "I hated school. I want to teach math, English, science in an engaging way." And the minute you try to be more creative, the principal says, "Nope. You gotta do more test prep. You gotta follow the curriculum." (as cited by Rizga & Lewis, 2016, "In May 2015," para 11)

Historically, Black segregated schools focused on countering racial stereotypes, instilling Black pride, and learning about the community. According to Rizga and Lewis (2016), "In the 50s, about half of all college-educated African Americans went into teaching—one of the few fields open to black professionals, especially women" (para. 7). However, this changed after desegregation, which propelled the mass firing of Black teachers and the beginning of the era of accountability. With initiatives such as A Nation at Risk, the No Child Left Behind Act, President Barack Obama's Race to the Top initiative, and the Common Core, the focus of education became school reform. Even though school reform has emphasized closing the "achievement gap" between White students and those of color, there has not been enough focus on equitable funding (Rizga & Lewis, 2016). This has led to urban school administrators chasing money tied to improving standardized test scores.

In 2014, the Center for American Progress (CAP) found that students in urban elementary schools spent, on average, 75% more time taking district-mandated tests than their suburban counterparts—in large part because the stakes for their schools were so high. In urban areas,

multiple-choice tests are a major part of the daily curriculum for students (CAP, 2014, as cited by Rizga & Lewis, 2016). The fact that students needs to be assessed is not the problem; the problem is the enormous amount of weight placed on these standardized test outcomes—and *only* these outcomes—so that the high test scores become synonymous with what it means to be "educated." (Wells et al., 2016). This leaves little room for students to build on their existing knowledge and bring their own cultural understanding to more abstract and unfamiliar topics, which research shows is the best way to engage students (Wells et al., 2016).

With each new school reform initiative, we will continue to see mass layoffs in large urban districts schools—where most Black teachers work—especially if they fail to raise test scores quickly enough (Rizga & Lewis, 2016). These test-based reforms also allow charter schools to open in the urban districts where school funds are linked to test accountability. The opening of charter schools essentially causes a competition between the charter and the district schools for state funding. As a result, more urban district schools close when they do not meet their numbers, which means more jobs are lost. This is especially harmful for Black teachers, who are more likely to work in urban settings because they traditionally feel a sense of connectedness to helping the underserved people who live there (Rizga & Lewis, 2016). Black professional educators are crucial to the Black community; without them, under-served students may not receive the same empathy as they would from a White teacher.

Burden of Being the Social Support

> *Part of a system of oppression is allowing the folks who have the power to create change feel as though they're responsible for keeping the narrative. So a lot of Black teachers go into urban schools and within the first 3 months they become the king or queen of*

> *discipline. Why? Because the system sees a Black face as a person who's supposed to help them meet their goals. But I don't want to meet those goals; I want kids to feel free. I want those kids to feel what emancipation is like in those classrooms, to feel like they can be themselves, their culture to be expressed. Just a Black face in the classroom helps the kids to connect, but it's not enough if that black person feels their role is to be the enforcer of a white folk's pedagogy.*
>
> --Dr. Christopher Edmins, as cited by Downs, 2016. para. 9

In the study, "Through Our Eyes: Perspectives and Reflections From Black Teachers," Griffin and Tackie (2016) interviewed 150 Black teachers in public and charter schools in seven states with the goal of gaining a better understanding Black teachers' unique experiences, why they teach, their perspectives on the state of education, what they believe they bring to the classroom, and the challenges they may experience in the workplace because of their race. The participants ranged in grade level and experience to represent the nation's demographics of Black teachers. Eighty percent of participants were female, nearly one third were veteran teachers with more than 15 years of experience, and 90% taught in cities (Griffin & Tackie, 2016). They found that Black teachers were often teaching the lower-performing students or students deemed troublesome because the Black teachers were assumed by their peers to be disciplinarians (Griffin & Tackie, 2016).

Griffin and Tackie (2016) concluded that Black educators in the study felt the academic burden of holding Black students accountable and encouraging them to reach academic success, not only in their own classroom but in their peers' classrooms as well. This reinforced the ideology of the Black teacher as the enforcer and disciplinarian. Since they were given this extra

responsibility, they were often not afforded the opportunity to teach students performing at higher levels, such as Advanced Placement courses. This burden of the social supporter caused the Black teachers to become frustrated because they were locked out of opportunities to enhance their own professional skills and advance their careers. Instead of spending their free periods learning new content knowledge, they were being called in to handle peer discipline issues. This extra responsibility took away from their planning time, professional development opportunities, and disrupted their time with their own students.

Burden of Mentoring

> *I feel like I have an obligation as a woman of color, who's a teacher, to provide the best type of example of a model — what my students should do, like as a person, you know, as they're character-building, and just how they carry themselves. And I do think that differs from White teachers. I don't know if they [White teachers] are coming into the role and thinking, "I want to make sure these students of color, I don't know, have good hygiene, you know, [are] performing at their best," and all of that.*
>
> --Griffin & Tackie, 2016, p. 6

The Black teachers in the Griffin and Tackie (2016) study felt the obligation of educating students beyond academics. They would even use their personal funds for students, if needed. Many of them often found themselves serving in the role of parent, hairdresser, chauffeur, advocate, counselor, and cheerleader). The Black teachers in the study also felt the pressure to be a role model for their students, especially if the student did not have positive role models at home. This pressure of being role models motivated Black teachers to share their own personal challenges to relate to and inspire their students of color (Griffin & Tackie, 2016). Many Black

teachers felt obligated to mentor their Black students so they could achieve academic success. Overall in the study, Black teachers accepted these challenges because they wanted to give back to their community and make a difference.

However, Black educators in the study felt frustrated with bearing the weight of being the representative for their entire race (Griffin & Tackie, 2016). These Black teachers stated, "We become the representative for every child of color, I mean, whether we relate to them, whether our culture is the same or not. We become the representative for all of those children" (Griffin & Tackie, 2016, p. 5). The Black teachers felt that they were able to leverage their cultural similarities to manage their classrooms, better discipline their students, and connect with the students. Lindsay and Hart (2017) even showed that African American students are less likely to be suspended when they have a Black teacher. Even though many of the Black educators appreciated and enjoyed acting as formal and informal mentors for their Black students, this responsibility was still a burden (Griffin & Tackie, 2016).

Hence, the weight of this often-unacknowledged mentoring obligation and the continuous stress it places on their professional lives to be "everything" for their students, as admirable as it seems, is tremendously tiring and burdensome (Griffin & Tackie, 2016), particularly given the absence of more Black colleagues and the lack of school resources to support their efforts. And, despite the fact that Black teachers often work more and harder than their White peers, they are generally "not at all supported or encouraged for being successful with [their] students" (Griffin & Tackie, 2016, p. 9). As might be expected, the consequence is often frustration and disillusionment with teaching.

Burden of Proving Their Worth

> *I think one of the challenges I dealt with was convincing parents that our decisions are the right decisions. And I say that because a lot of parents would look to the White teachers and whatever they say was golden. There was no questioning them. Whatever they said was the right thing. But when it came to the African American teachers, it was always a question. There was always some pushback. There was some uncertainty around* " *What is it exactly? Why do you know that?*"
>
> --Griffin & Tackie, 2016, p. 6

Despite all that Black teachers are doing to support their students, they often still feel the burden of proving their worth. Black teachers in Griffin and Tackie's study (2016) felt limited to acting, as discussed earlier, as disciplinarians, instead of being respected for their ability to manage their classrooms. Black teachers put in extra time and effort, but still weren't heard in staff meetings. Black teachers often feel irreverent and silenced in urban, rural and suburban contexts, even in the topic of conversation of multicultural education (Buendía, Gitlin, & Doumbia, 2003; Ladson-Billings, 1996; Milner & Woolfolk Hoy, 2003; Pang & Gibson, 2001).

Black teachers expressed that they were often perceived as subpar educators without the ability to teach a range of learners (Griffin & Tackie, 2016). Some of the Black teachers' peers had the perception that Black teachers were not as educated or as knowledgeable as others. Black teachers told stories of their degrees and certifications being questioned by administrators, parents, and students. Black teachers in this study also felt they had to constantly remind others of their qualifications to have their voice heard by their peers (Griffin & Tackie, 2016). They felt like they had to work harder and struggle to appear more professional just to be deemed qualified

by White school officials and their White peers. This required the Black teachers to "code switch," or regulate their behavior based on mainstream notions of what it means to be and speak professionally. The Black teachers in the study ultimately voiced the burden of not being heard and feeling undervalued in their school community, although they stayed nevertheless.

Staying, Despite the Burdens

> *Well, I don't think I can separate being a parent from my job as a teacher. Because I'm teaching my own children. I look at the children that I serve as an extension of me. I want them to go out and be their very best, because they represent me.*
>
> --Griffin & Tackie, 2016, p. 6

Black educators stay in teaching, despite the burdens, serving as models for Black students and oftentimes working far beyond what is required. They do this because they value the student relationships they form and feel called to give back to their own community (Griffin & Tackie, 2016). Griffin and Tackie noted that the Black teachers in their sample voiced having cultural and experiential similarities to their students, which helped them build connections with them, especially Black students. Those immediate and surface-level connections allowed many Black students to trust their Black teachers and feel safe in their care. Black teachers in the study also felt as if they had a duty to provide a quality education to Black students, even when they had to go above and beyond the work of their White colleagues.

Black teachers also frequently noted that White teachers were less merciful and failed to empathize with Black students because of a lack of cultural connectedness (Griffin & Tackie, 2016). The students put forth effort and achieved academically and socially because of high expectations. This idea is supported by Siddle-Walker (2000), who concluded that because of the

hard work and dedication of Black teachers, Black students did not want to let them down. This left Black teachers with the moral obligation of taking care of Black students, beyond their academic needs. As a result, Black teachers became the "warm demanders," holding high expectations for all students and using connections with students to establish structured classroom discipline (Griffin & Tackie, 2016).

Yet, despite the burdens faced, Griffin and Tackie (2016) noted that the empathy of Black teachers, along with their other strengths, allowed them to provide a quality education to all children, but especially to marginalized students of color. Black educators' strengths go beyond just being a physical role model. Black educators bring diverse family histories, values, and experiences and attributes to students in the classroom that are often not found in textbooks or standard pedagogical viewpoints (Pang & Gibson, 2001). This deep commitment to students caused Black teachers to stay, despite the many burdens they faced daily in the course of their teaching. Hence, understanding the conditions that Black teachers face and the reasons they remain in teaching is essential to rethinking the experience of Black female STEM teachers.

Significance of Black STEM Teachers

Teaching is a source of black woman empowerment, and society is better for it.

– Andre Perry (2015)

Former Secretary of Education King stated:

> We have strong evidence that students of color benefit from having teachers who are positive role models, as well as from the changes in classroom dynamics that result. Teachers of color often have higher expectations for students of color, are more likely to

> use culturally relevant teaching practices, are more likely to confront racism in their lessons and, yes, also serve as advocates. (as cited in Elelman, 2016, para. 7)

That is not to say that Black teachers can only teach Black students because teachers from any ethnic background can be effective and can successfully teach Black students (Cooper, 2003; Gay, 2000; Ladson-Billings, 1994). Gay (2000) stated, "The ability of teachers to make their instruction personally meaningful and culturally congruent for students account for their success, not their [ethnic] identity *per se*" (p. 205). However, there is value in listening to Black teachers discuss how they engage and work alongside Black students for empowerment. Milner (2002) expressed the belief that Black students experience and learn differently because they bring a set of situations that has been influenced by racism and inequity.

These historical forces stem not only from the historical context of when Blacks were not considered humans by our founding fathers in the Constitution, but also emerge in our daily lives from micro aggressions, systemic oppression, and color-blindness. Since these experiences are shared by many Black teachers and Black students, the loss of African American teachers and the interactions Black students have with these teachers have been, and continue to be, detrimental to the overall success of African American students (Milner, 2006). Furthermore, Hudson and Holmes (1994) explained, "The loss of African American teachers in public school settings has had a lasting negative impact on all students, particularly African American students and the communities in which they reside" (p. 389). Siddle-Walker (2000) stated that Black teachers during Segregation were consistently remembered for their high expectations for student success, their dedication, and their demanding teaching style.

By not acknowledging the role Black teachers play in education, we are doing a disservice to all students, but in particular Black students. According to Milner (2006):

> Black teachers, similar to all teachers, are texts themselves, but these teachers' text pages are inundated with life experiences and histories of racism, sexism, and oppression, along with those of strength, perseverance, and success. Consequently, these teachers' texts are rich and empowering—they have the potential to help students understand the world and to change it. (p. 92)

Furthermore, the lack of Black teachers to serve as role models is detrimental to our education system, not only for Black students, but for White students as well. Former Secretary of Education John B. King Jr. at the National Summit on Teacher Diversity held at the U.S. Department of Education (2016) said,

> It's important for students of color to have role models who look like them and share common experiences. It's just as important for all students to see teachers of color in leadership roles in their classrooms and communities. We must work together to support states and districts as they work to prepare, hire, support, and retain a more diverse teacher workforce. (para. 2)

Black girls are suspended at a rate six times higher than White girls for the same offenses, yet this number decreases when a Black girl has a Black teacher (Graves, 2014; Lindsay & Hart, 2017). Atkins and Wilkins (2013) claimed that Black female teachers serve as role models and provide active guides for romantic choices and stress the importance of future education, which is associated with lower teen pregnancy rates among Black girls. Gershenson et al. (2016) showed that Black female teachers were more optimistic about the abilities of Black

students than any other group. There are also studies that showed that there are higher test scores for minority students in schools with more Black teachers (Meier et al., 1999). Price (2010) and Rask and Bailey (2002) concluded that Black students' probability of majoring in STEM increases if they have a Black instructor for a STEM course. Yet, there is sparse research on the double jeopardy experienced in the STEM classroom that examines both gender and racial disparities in choice of major (Hanson 2004, 2007; Riegle-Crumb & King 2010). As of late, an emerging amount of research has begun to focus on the importance of studying the development of students before they enter the higher education context, especially around the gender gap in STEM in high school (Bottia, Stearns, Mickelson, & Moller, 2015; Legewie & DiPrete 2014a, 2014b; Wang, 2013).

Moreover, researchers have argued that high school is a critical time in the formation of career and major field of study aspirations, and this time period affects an individual's trajectory (Legewie & DiPrete 2014a, 2014b; Maltese & Tai 2011; Valian, 1998). Bottia et al. (2016) contended that if America wants to combat the under-representation of women in the STEM fields, this issue cannot be solved by solely focusing on retention of females in STEM once they are already enrolled in college. Furthermore, to make equitable impact on the distribution of students who pursue STEM degrees requires focus on the students in secondary schools (Bottia et al., 2016).

Bottia et al. (2016) have examined the effect of the racial and gender composition of math/science faculty in high schools and how it influenced students' choice of majors for college. They argued, "Whether they are passive or active representatives of their students' interests, math and science teachers may serve as a resource for students at their high schools in

many ways" (Bottia et al., 2016, p. 89). Moreover, research shows that as high school students gain an understanding of what they like and do not like, intentions are formed regarding major field of study; these intentions are one of the strongest predictors of the fields of the major chosen once the student enters college **(**Hossler & Stage, 1992; Legewie & Diprete 2014a; Maltese & Tai, 2011; Schneeweis & Zweimuller, 2012; Tracey, Robbins, & Hofsess, 2005; Wang 2013). A study by Bottia et al. (2016) revealed:

1. The racial composition of the school's math/science teachers was not significantly associated with young men's or young women's chances of graduating with a STEM major.
2. White girls are more likely to declare STEM majors and to graduate with those STEM majors when they attended high schools with proportionately more female math and science teachers
3. No conclusive influence of between organizational demography and STEM outcomes for African American girls has been found.

!"**!** Young women's chances of graduating with a STEM major are also enhanced if they attend secondary schools with higher proportions of female science and math teachers.!#

Bottia et al. (2016) speculated that the inconclusive results around race in their study were due to the high percentage of math and science teachers who were White. For the period of study in her sample, 52% of the math and science teachers were White females, whereas only 10% were Black. However, in general, a higher proportion of female math and science teachers may improve girls' perceptions of the cultural setting of STEM classrooms and help them to

view STEM as more welcoming to women (Fox, Sonnert, & Nikiforova 2009; Statham, Richardson, & Cook, 1991) and less male-biased (National Alliance for Partnerships in Equity, 2013). Female teachers in math and sciences, moreover, have been shown to have higher subjective evaluations of their female students and to encourage them more than male teachers do (Dee 2005, 2007; Ehrenberg & Brewer 1994; Hanson 1996). In addition, research done by Tennessee's well-known experiment in reducing class size, Project STAR (Student Teacher Achievement Ratio), found that among Black children, having a Black teacher for a year was associated with a statistically significant 3 to 5 percentile-point increase in math scores (Dee, 2004).

Bottia et al.'s (2016) study showed that there should be policies that advocate for an even greater increase of female secondary math and science teachers in high schools to increase the number of White female STEM majors. In addition to that, Bottia et al.'s (2016) findings showed that more research must be conducted on the intersection of gender and race in the STEM classroom as it pertains to teachers and Black female students.

Experiences of Black Female Science Educators

Currently, there is no quantitative data available on the number of Black female secondary science teachers in the nation. Not only is there limited quantitative data, but also there is limited qualitative data that includes the voices of Black female science educators at the secondary level. In addition, science education is moving toward a cross cutting and interdisciplinary form of science, commonly known as STEM (NGSS Lead States, 2013). Nevertheless, one study provided a glimpse of the experience of Black female secondary STEM educators in an urban setting. Although this study doesn't engage only Black women in science,

given that my dissertation is focused Black female secondary science educators, Kokka's (2016) study provides a race analysis that engages both race and the STEM subject matter being taught.

Kokka (2016) conducted a study to determine the reasons urban teachers of color stay in the STEM classroom and how they experience job satisfaction. The location for the study was an under-resourced urban public school in the United States, with high retention of long-term math and science teachers; many of whom were of color. The student population was comprised of 98.5% students of color, 35% of whom were African American. Kokka noted that the problem of teacher attrition was particularly acute in schools situated in urban areas, but especially in the subjects of mathematics and science. Ingersoll and May (2011) similarly blamed turnover for the shortage of highly qualified mathematics and science teachers.

In Kokka's (2016) study, she selected 16 participants who had been teaching STEM for seven to 24 years. Of those 16 participants, five of them were African American and 11 of them were teachers of color. When speaking to the teachers in the survey, Kokka found that the teachers expressed dissatisfaction with administration around disciplinary issues and instructional autonomy. One female African American science teacher described being perceived as the "angry black person" in a STEM fellowship program where she was the only African American in the program. The teacher felt ignored; she was treated condescendingly, as if she was not on the same level as her peers. When Rizga and Lewis (2016) interviewed Black teachers, they found an award-winning science and math teacher with 35 years of experience in Philadelphia schools who described a lack of voice and lack of respect as reasons for Black teacher departure.

The Black female STEM teachers in the study expressed an arduous desire to be role models for their students because they noted how rare it was to find African American women in STEM fields. For example, one female STEM teacher stated, "She's just like me, and I still talk like them. I still live in the same neighborhoods as them" (Kokka, 2016, p. 174). The African American STEM teachers wanted to plant seeds and counteract the stereotypes of Black students. They worked to form close and meaningful relationships with their students without judgment. For example, one of the female Black teachers described an incident in which a student's gun went off in her classroom, but she still referred to the student as her favorite, demonstrating empathy despite his actions.

These finding suggest that recruiting teachers who are familiar with the community may improve their retention within schools in urban settings, especially when administrative support is lacking. Overall, African American female STEM teachers expressed a desire to be role models for their students and chose to work within their school because that is "where the struggle is." This suggests that African American teachers feel a sense of racial solidarity with African American students (Dickar, 2008). The Black STEM teachers expressed a shared understanding between their Black students and themselves. Yet, the other teachers of color did not express the same desire to give back to their community (Kokka, 2016). This issue of cultural connectedness points to the important need to understand and critically examine the intricate and complex experiences of a Black teacher. Griffin and Tackie (2016) explained the issues

> that stifle the development and empowerment of Black teachers are so deep-seated that it will take honest and critical examinations of school cultures and systemic processes in

order for school and district leaders to develop the trust, support, and collegial working environments needed to recruit and retain teachers of color. (p. 11)

Therefore, to have a truly socially just and culturally democratic education, we must come to understand the reasons that for the absence of Black female secondary science teachers in urban schools.

A Seat at the STEM Educational Table

You don't even see what I can bring to the table . . .

all you do see is that I don't belong at your table.

--Turner, 2016

This chapter has provided an examination of various aspects related to the retention and recruitment of Black teachers in U.S. schools, with a particular focus on Black female STEM teachers. What is apparent from the different aspects of the discussion offered on the subject is the critical need to explore the absence of Black female teachers in the STEM field and, hence, their lack of a viable seat at the STEM educational table. This study sought to address this need by conducting a qualitative study that critically examined the perceptions of Black female teachers in STEM secondary education regarding their experiences with both recruitment and retention.

CHAPTER 3

METHODOLOGY

I can only answer the question " *What am I to do?*" *if I can answer the prior question* " *Of what story or stories do I find myself a part?*"

--Alasdair MacIntyre, 1984, p. 211

Black female science teachers experience triple jeopardy due to the fact that they are neither the dominant race nor the dominant gender in the field, and because they teach in a field that has historically racialized their practices. To answer the questions that inform this study in a humanizing way, this research was conducted collectively with participants, using a qualitative methodology that is also tied to a decolonizing intent. This was undertaken through the use of critical narratives, which engage the context and richness of Black women's voices—voices that still remain absent in the discussion of science teacher recruitment and retention. Critical narratives allowed these voices to contribute to discussions of policy reform for Black female secondary science teachers, particularly as they pertain to recruitment and retention. This study employed critical pedagogy, critical race theory, and Black feminist thought as powerful conceptual frameworks for analysis of the stories shared by participants.

With this in mind, this chapter discusses the research methodology used in this study, the research design, reliability and questions of validity based on Polkinghorne (1988) and Webster and Mertova (2007). This is followed by a discussion of critical narratives and decolonizing methodologies and how these help address the complexities and subtleties of human phenomena and capture the multiplicity of voices of all people, including those voices that remain in the margins (Clandinin & Connelly, 2000; Webster & Mertova, 2007). The chapter concludes with

the rationale for why critical narratives and decolonizing methodologies were the most appropriate for this emancipatory study and finally, the researcher's role, anticipated findings, and the expected limitations of this study, along with the timeline for completion of this work.

Research Questions

As stated in Chapter 1, the purpose of this research was to promote a shift in how we think about the teacher recruitment process, by providing a place for Black science teachers to voice their perspectives in ways that can move us toward creating a more just and inclusive recruitment process. The following three research questions satisfy the primary purpose and intent of the proposed study:

1. What do the stories of Black female secondary science teachers tell us about issues related to their recruitment and retention within the science teaching force?
2. How do Black female secondary science teachers explain the shortage of Black females entering the STEM field? What do they believe should be done to increase the number of Black females in the field?
3. What contributions do Black female secondary science teachers make or potentially would like to make to increase the number of Black females entering and remaining within the science teaching force?

Research Framework

Two important research frameworks, within the context of a qualitative research approach, inform this study: critical narrative approach and decolonizing methodology. These frameworks are consistent with creating a place for the silenced voices of Black female secondary science teachers to rise to the surface and counteract the traditional homogeneous

voices used to discuss teacher recruitment and retention in America. This is done with the incorporation of central concepts related to critical pedagogy, Black feminist thought, and critical race theory. These conceptual frameworks serve to provide context with respect to the historical implications of the Brown vs. Board of Education decision and to critically understand the recruitment and retention problems facing U.S. schools.

Critical Narrative Method

The critical narrative method, which focuses on the voices of those who have often been voiceless, lends itself to a decolonizing process for collecting counterstories and centering the voices of the Black women participating in this study. DeVault (1990) noted that, often in feminist research, women of color's voices are not heard. She stated, "Women who are positioned differently learned to speak and hear quite different versions of 'woman talk,' adapting to distinctive blends of power and oppression" (DeVault, 1990, p. 98). Clandinin and Connelly (2000) maintained that by using the narrative approach, the researcher attempts to capture the "multiplicity of voices" involved in creating the plotlines of stories. Riessman (1993) emphasized that narrative is inherently interdisciplinary because it does not sit neatly within the boundaries of any single scholarly field. Due to the interconnectedness of narratives, individual stories are situated not only within particular interactions but also within social, cultural and institutional discourses, which are vital to their substantive interpretation.

Critical narratives are fundamental to explaining how history is linked to the past of the family, the city, the nation, the collective pain and wounds, expectations, and obligations (Goodson & Gill, 2014). Goodson and Gill, moreover, stressed the necessity of using the critical aspect in narratives: "A theory is critical in the sense that it seeks to uncover these circumstances

that have enslaved people, so that humans can be free from domination and oppression" (Goodson & Gill, 1990, p. 40). To understand the missing-in-action phenomenon of Black science teachers, this study sought to move through social, political, historical, and personal contexts to make meaning (Darder, 2015).

Freire (1996) contended, "Human beings are because they are in a situation. And they will be more the more they not only critically reflect upon their existence but critically act upon it" (p. 90). Black women are missing in action from science education, not because of mere circumstance, but because of the direct ramifications of cultural, historical, social, and political oppression. This rejects that idea that "denies that man is abstract, isolated, independent and unattached to the world; it also denies that the world exists as a reality apart from people" (Freire, 1996, p. 62). There must be dialogue about oppression, which supports the process of naming it, and critically acting to change it (Darder 2015; Freire 1996). Hence, critical narratives are essential, in that a narrative is not just a story but also a process (Goodson & Gill, 2014).

Narratives are considered, then, a way to heal and assist the person to transform his or her stories into meaning and, more importantly, into optimism, possibility, and hope (White & Epston, 1990). The process of unmasking the world and moving toward social transformation is contingent on the emancipation of the individual (Darder, 2015; Freire, 1996; Giroux, 1988). The only way to conceptualize the phenomenon of the missing-in-action Black science teachers central to this study was by listening to narratives and engaging the knowledge of these participant in ways that could point toward transforming hegemonic retention and recruitment policies into open and inclusive ones. By so doing, an emancipatory recruitment and retention policy could emerge; one that shapes the future for both students and teachers, in ways to support

the making of a more just world (Dyson & Genishi, 1994; Ricoeur, McLaughlin, & Pellauer, 1988).

Decolonizing Methodology

Darder (2015) argued, "Any decolonizing methodology must begin with the view that all human beings participate actively in producing meaning, irrespective of their social location" (p. 71). The essence of this methodology is that it is communally performed to support subaltern communities in calling for more humanizing and inclusive forms of education (Darder, 2012). In the context of this approach, researchers from oppressed communities can address the culture, historical, and economic conditions that uphold the hegemonic system through which they are marginalized (Darder, 2015). This methodology is rebellious because it challenges the privileging of Western philosophical assumptions that silence the voices and ways of knowing of the oppressed. As such, it questions hegemonic knowledge deemed superior, rejects that subjects are free of historical acts enacted upon them, and addresses the cultural politics used to dominate people and reproduce inequalities.

Central to a decolonizing methodology is an understanding that we are entangled in asymmetrical relations of power and, thus, we must struggle in community to produce emancipatory and counterhegemonic knowledge that can counter conditions of privilege that reinforce structures of exclusion. As such, this methodology encourages the research to take a stance—in this instance, that Black female science teachers have a voice and a right to create an inclusive emancipatory recruitment and retention process to counteract the inequalities at work in today's educational system. Decolonizing methodology, therefore, is "an empowering process of knowledge construction that is also deeply rooted in the researcher's worldview" (Darder, 2015,

p. 72). This methodological understanding guided my engagement with the narratives collected for this study, in that the intention of this study was to unearth, through participants experiences and insights, ways to disrupt the status quo and develop grounded recommendations to transform the future experience of Black female science teachers at the secondary level.

Research Design

The research design employed for this study is closely aligned with my premise that marginalized voices are not heard due to inherent racism that is built into our legal system and cultural and social oppression (Ladson-Billings, 1998; Tate 1997) and research must create spaces where these voices can be heard. The following discussion provides a description of the research design that informed the collection and analysis of data.

Research Location

This study took place in a school district in Los Angeles where the number of minority students outnumbered White students significantly and was considered one of the largest school districts in the nation (NEA, 2015). As of 2017, this district is located in a city with a population of 3,971,896, with a per capita income of $30,136 and median household income of $52,024 (Census Reporter, 2017). While 48% of the city's population has a household income under $50,000, the median home price is $542,100 (Census Reporter, 2017). The district enrolls more than 640,000 students in kindergarten through 12th grade, at over 900 traditional public schools and 187 public charter schools (district website). Nearly half the district's students receive free or reduced lunch (district website). The district has 895 Black secondary teachers out of a total of 8,235 secondary teachers (district website). Between 2002–2011, Black teacher attrition occurred approximately at the rate of 1 in 3 teachers (NEA, 2015). At the time of this study, there was no

public information available about the percentage of Black secondary science teachers, echoing the dearth of data at the nation.

Participants

Participants for this study consisted of six female high school science teachers who identified as Black, teaching in the district. I identified participants by using a snowball technique or convenience sampling (i.e., contacting colleagues I knew) due to the limited number of Black female science teachers in the field, as mentioned previously. Hence, I either knew these women personally or they were referred by a school leader in the district or gatekeeper. As stipulated by White (1981), a gatekeeper is usually a leader in the community who gives access to the researcher. The study focused on co-constructing knowledge *with* participants, as supported by Denzin and Lincoln (1994) and Briggs (1986), who maintained that there can be no neutral truth in research because the participant and the interviewer construct the knowledge together through their lived experiences.

Data Collection

I conducted narrative sessions with all the women in a neutral site convenient for participants. Being a Black female, I hoped to achieve an emic perspective by gaining the women's trust and achieving rapport during the narrative sessions, so that the participants felt comfortable telling their stories (Richie, 1995). I had every woman complete a profile questionnaire (see Appendix A) prior to the narrative session, which included years teaching, credential, degree, and so forth, to allow for more time in their session for their stories. When necessary, I used prompts (see Appendix B) during the narrative sessions to support participants, and hopefully, to deepen and enrich the data collected, However, given the purpose and intent of

critical narratives, the participants were encouraged to lead the direction of their storytelling. Unlike semistructured interviews, which reinforce a power dynamic where the researcher is an authority figure that controls the conversation (Briggs, 1986), critical narrative sessions are structured to respect the process of the participant in speaking of the phenomenon being studied.

I recorded the narratives using a recorder, UX533 Sony digital dictation machine. Prior to recording, the participants signed a consent that confirmed their permission to record the conversation. Instead of focusing on taking copious notes, I created a shared environment of trust. DeVault (1990) stated, "When women interview women, both researcher and subject act on the basis of understandings about interviewing, and both follow the rules (or negotiate a shared version of the rules) associated with their respective role" (p. 101). I used the transcription service Verbal Ink. I used this transcription service because I am cognizant of Flick's (2014) suggestion to use a service that has a data protection contract, which guarantees that the transcribers do not use the information from the interviews (about the people or institutions involved) for any other purpose.

To preserve each woman's speech pattern and discourse style, I did not edit, condense, or smooth out respondents' comments. I left the "ums," "you knows," and "likes" in the transcription. I did not want to take ownership of someone else's thoughts or words, which has serious implications in silencing women (DeVault, 1990). I found that DeVault's claim that there is a limited amount of literature that critically discusses transcription methods is true. Therefore, I used Flick's (2014) work on transcription to guide my transcription process. Flick stated that transcripts should be word-processed, numbered by fives, and reset on every new page; therefore, I structured my transcription in this fashion.

Data Analysis

Although this research is grounded in a critical approach, I took a generic approach to my thematic coding supported by Coffey and Atkinson (1996), who believe that there is no single formula or "best" practice to analyze stories because they are socially and culturally managed and constructed. Given the critical pedagogical and decolonizing intent, as well as Black feminist thought that informs this work, I thought beyond the data to analyze the narratives, which provided a critical way of examining not only key actors and events, but also cultural conventions and social norms (Coffey & Atkinson, 1996).

To be specific, codifying data refers to the process of arranging ideas in a systematic order by segregating, grouping, regrouping ideas to consolidate potential meanings and explanations. Through this process, the researcher searches for characteristic patterns and categorizes the ideas expressed by participants to help explain the phenomenon being studied (Saldaña, 2009). With this in mind, I followed the generic approach to coding because even though there are myriad ways to analyze and code data, some argue that generic approaches are more "honest" and closer to reality than most empirical methods because they are reflective and retrospective (McNamara, as cited by Webster & Mertova, 2007).

Creswell (2009) argued, "Often we see qualitative data analysis reported in journal articles or books that is a generic form of analysis. In this approach, the researcher collects qualitative data, analyzes it for themes or perspectives, and reports 4-5 themes" (p. 184). True to this critical and decolonizing approach, I carefully reviewed and coded transcripts by hand for the major repetitive themes and issues raised by the voices of participants, which were not only

most pertinent to answering the research questions that inform this study, but also directly linked to the underlying conceptual frameworks discussed earlier, which drove the research design.

I used member checking to guarantee that the voices of the Black female secondary science teachers were authentic and not just my bias interpretation. For authenticity purposes, all of the participants were able to review the transcripts of their narratives, as well as my summary of the analyzed the data and findings near the end of the research project (Lincoln & Guba,1985). In this way, each participant had the opportunity to critically analyze findings and comment on them, as suggested by Creswell (2007). This helped to verify the accuracy and completeness of the findings to improve the external validity of the study (Cohen & Crabtree, 2006; Lincoln & Guba, 1985).

Another benefit of member checking is that it can counteract some of the forces of dehumanization in academia, by allowing critical reflection to occur. For Grumet (1976), the relationship of narrative experiences is reclaimed through a reflective process that begins by allowing the mind to wander and continues by providing rich descriptions to situate the narrative. In addition, Hutchinson, Wilson, and Wilson (2007) discovered that member checking facilitates self-acknowledgement, a sense of purpose, self-awareness, empowerment, and healing, and provides a voice for the disenfranchised; many of these reflective processes came during the member checking phase. Lowes and Gill (2006) also noted that when research participants can find in-depth conversations "about emotive topics helpful, even a therapeutic, experience" (p. 594). In this way, the process of reflection within narrative research can help participants conceptualize their life experiences in ways that allow them to shift from a tradition of being powerless to one of empowerment.

Lastly, in my analysis and findings, I used the pronouns "we," "us," and "our" because I accept Black women experiences as situated knowers as supported by Black feminist thought (Collins, 2000) and I, as a Black female high school science teacher, am also a member of the phenomenon under interrogation.

Reliability and Validity

Oftentimes, validity in research (Polkinghorne, 1988) focuses on statistical results without taking into account the life experiences of the individual. However, critical narrative research aims to use stories to give power to those who are marginalized, such as the Black female science teachers who were the participants in this study. Since narrative research cannot provide results that produce generalizable truths but rather a multiplicity of truths, validity in narrative is more concerned with the research being well grounded and supportable by the data that has been collected (Polkinghorne, 1988; Webster & Mertova, 2017). The goal of these narratives, then, was to challenge the hegemonic view of Black female science teachers and, thus, help us to better understand the missing-in-action phenomenon. Amsterdam and Bruner (2000) argued, "Stories derive their convincing power not from verifiability but from verisimilitude: they will be true enough if they ring true" (p. 30). Further, "Narrative research aims for the verisimilitude not the exact truth but aims for the findings to be 'well grounded' and 'supportable', and retaining an emphasis on the linguistic reality of human experience" (Polkinghorne, 1988; as cited in Webster & Mertova, 2007, p. 3).

When using narratives, reliability refers to the trustworthiness of the data, the strength of the analysis of the data, and the ease of access to that data (Polkinghorne, 1988; Webster & Mertova, 2017). However, some authors have argued that when using unstructured narratives,

the research sends to scores higher on the matter of validity than quantitative approaches, but lower on reliability (Webster & Mertova, 2007). However, Huberman (1995) contradicted the concept of high reliability being achievable and claimed that if rigorous methods of reading and interpreting are utilized and other researchers can track down their conclusions, then it demonstrates honesty in the original researcher's work. Webster and Mertova (2007) argued, however, that the terminology, validity, and reliability must be re-examined when using this methodology, given that narrative research focuses on the reality of the human experience for each individual and then tries to comprehend shared understandings. Therefore, when I listened to my participants' often-unheard stories about the missing-in-action phenomenon, I focused on honesty, verisimilitude, authenticity, familiarity, and transferability, instead of more traditional approaches not beneficial to narrative research (Huberman, 1995; Polkinghorne, 1988).

Role of the Researcher

Connelly and Clandinin (1990) asserted that it is very easy for researchers to lose sight of their role in the research, which causes undisclosed bias within the research. Connelly and Clandinin also maintained that researchers have a tendency to try to create positive endings regardless of the indication of the data, a phenomenon known as the "Hollywood effect." In traditional Western academia, there is an emphasis on maintaining boundaries between the participant and the researcher, which is considered a "regime of truth" (Smith, 1999). Furthermore, Darder (2015) argued, "[Decolonizing researchers] do not enter the arena as impartial and neutral observers or solely objective thinkers but, rather, as transformative intellectuals, grounded in a humanizing emancipatory political vision of inquiry" (p. 71).

True to a decolonizing approach, I co-constructed my dissertation with my participants. This dissertation acted as a conduit for knowledge around the missing-in-action phenomenon constructed by both the Black female science teacher participants and their experiences as well as my own as their colleague in the field. There is power in one's lived experiences and the decolonized approach is anchored in history and lived experiences (Darder, 2015; hooks, 1994). My goal is not to create a generalizable universal truth but instead to provide a mere glimpse of this phenomenon and how these Black women believe recruitment and retention policies can be inclusive to Black women. Hence, this study sought the voices of participants, including my own, be heard democratically. Darder (1994) discussed the importance and contributions of a cultural democratic research approach for it "begins with the view that human beings participate actively in producing meaning and knowledge in their ongoing interactions with the environment" (p. 32). To do that, there must be a process of reflection, dialogue, and action where we "reformulate new truths that are more in line with emancipatory practices" (Darder, 2015, p. 75).

Limitations of the Study

Some may argue that a major limitation of this study was the small sample size consisting of six participants. Additionally, regional demographic differences might be at work in that all the participants were from Southern California. However, this small sample size allowed for an in-depth insider's view of the phenomenon and yielded rich data that captured participants' insights. This means that findings may not be generalizable, but this is not the purpose of critical narratives. Another limitation is that the study focused on women who all worked in the same school district, which allows for stronger internal validity but also decreases generalizability.

Furthermore, I may have experienced some difficulty in locating participants and there was no systematic data available to identify Black female secondary science teachers, which was justification for the use of a snowball technique or convenience sampling in identifying participants. While this may have led to a biased sample, I hope to have gained an emic perspective rooted in decolonizing and critical narrative methodology, which rendered validity to the data I collected.

CHAPTER 4

HIDDEN FIGURES – THE NARRATIVES

Black history is full of hidden figures . . .

– Ashley Dejean (2018)

This chapter introduces the narratives of the six Black female educator participants comprising this study. One educator had less than 2 years of teaching experience. Three educators had between 5 to 9 years of experience. Two of the participants had over 15 years of experience. At the time of the narrative sessions, all six participants were teaching high school science classes within one of the largest districts in the country in Los Angeles. These narratives took place in the spring of 2017. The approach to this chapter is to present the stories of the Black female science secondary teachers who participated in this study in a way that honors their voices and experiences. In this way, the particular contribution of each woman to this study is highlighted. At the end, the major themes that emerged across the narratives are identified, in preparation for the analysis of the data in Chapter 5.

This study is comprised of the following six self-identified Black female science educators (see Table 1). Pseudonyms were used to protect their identity. The table below highlights the participants who informed this study. Their personal lives, experiences, varied and also intersected in many ways. Some of the women were married, had children, were in a relationship, and/or were single. All except Mary Jane were on a different career path before becoming a high school science teacher. Kayla had been a graphic designer for the fashion industry. Charlotte and Janet had worked in the corporate world. Teyana had owned and

overseen her swim business and Victoria had worked as a behavioral therapist. What follows are the narratives of six participants.

Table 1

Participant Profiles

Name	Identity	Years of Teaching Experience	Single Subject Credential
Kayla	Black	9	Biological Science & Earth Science
Charlotte	Black	8	Industrial & Technology Education
Janet	Black	22	Career Technical Education & Biological Sciences
Teyana	Black (Dominican)	8	Chemistry & Biological Sciences
Victoria	Black	1.5	Education Specialist Instruction
Mary Jane	Black (Belizean)	17	Biological Science & General Science

Kayla

I could get a job at a lab and make twice as much and not have to deal with this. So why?

Kayla received her bachelor's in psychology and Black studies and a master's in educational psychology. She possessed a Biological Science and Earth Science credential. Kayla had 9 years of teaching experience. She was born and raised in Los Angeles. Her father was a stand-up comedian and actor, and Kayla classified her mother as "a writer of sorts" because she wrote children books, but had also had multiple jobs throughout her career.

Kayla recalled that her father thought she would be the next one to go into entertainment and become an actor. But Kayla stated, "I turned out to be kind of nerdy. I loved nature." Kayla

classified herself as a "B" student throughout school and even stated that she felt average, in regard to academic achievement. Kayla shared:

> I don't want to say completely average because obviously I was a Black student. I was really high achieving for a Black student, but it was like always in that context of being, "Wow, you did really well for a Black student." It wasn't really well for everyone, it was just really well for Black students.

It was then that she began to notice the dichotomy between the Black female experience in education versus that of her White counterparts. Kayla described that she felt very uncomfortable in her skin in high school, since she was tall and she felt pressured to join the basketball team. This influenced her decision to go to college for sports medicine. It combined her love of basketball with her love of science. However, when she entered college, the competitive nature of science turned her off, and she changed her major to psychology.

As Kayla's graduation date neared, she was initially recruited by LAUSD because she had worked with the program Jump Start. Kayla also applied for Teach for America at that time but was rejected because of her grades. In the end, Kayla didn't pursue teaching and went into fashion as a graphic designer for a few years. Over time, she began to consider other options. Kayla recalled, "I looked out the window one day, sitting in downtown and was like, I want – I want a summer break. What can I do that would give me a summer break? I just want that time." Kayla found her old paperwork from LAUSD, went through the process of taking the necessary tests, and passed. The following week, Kayla started the district interns 3-week training program and began teaching at a school in Westchester, where she still taught.

Kayla emphasized that up until 2 years previously she had really loved teaching. Her initial thoughts about teaching were, “I can’t believe they pay me to do this. Like I get to hang out with kids and just like tell them about all this cool, random stuff that I know. Yeah, it was really cool.” However, recently things had become more difficult because she had gotten involved with more of the politics on her school’s campus. The struggled with school politics which influenced Kayla’s decision to never be a school administrator. She was not sure if she was a lifelong teacher either. She stated, “I’m either teaching or I’m not doing anything in teaching at all.”

Despite her recent issues with school politics, Kayla still enjoyed the same aspects of teaching that had kept her working in the field. Kayla emphasized that she really liked her relationships with her students because she tended to have a strong rapport with them. Kayla valued being able to support young adults, even when they may act irrational or have emotional breakdowns. “I like being able to go, ‘So you know, that sounds crazy. Let’s think about this from a more sane perspective.’ And they’re like, ‘Oh yeah.’ And then they calm down, and they feel better.” Kayla believed that her background in psychology helped her to better support her students and explain the science of some of their emotional issues.

However, having great rapport with students may not have been enough to keep Kayla in the profession. Kayla noted that she thought about leaving the profession at least once a year, and she had legitimately looked into other career options. When looking into other careers, she felt that anything would be easier than teaching, except perhaps being a police officer or enlisting in the military. One of the hardest parts of being a Black female educator is the emotional baggage and the stress experienced on a daily basis. Kayla stated:

> The kids are really, really rough. They're rough. They're – they're –they need more than what we can give. They – they need more – we are dealing with – right now I feel like this generation – and I don't know what this generation would actually even mean. But, um, any kid who's had a smartphone for the last – for a good majority of their life is dealing with addiction to their smartphone. And like self-imposed attention deficit. The combination, with the lack of support from the school district and the federal government, the state government are just – and some of the mandates in terms of, uh, discipline, or um even just what we can do to steer students in the right direction because it doesn't all have to be discipline. We have – we're implementing restorative justice right now – a lot of these things are not being taken seriously and we need more manpower and a lot of the manpower comes from budgets and the budgets are cut and everything has been downsized.

Kayla felt a lot of pressure to support students emotionally because they confided personal or emotional issues to her, such as "my dad is cheating on my mom." She explained that when teachers have good rapport with students, it makes those students open up and confide in a way that may lead to more stress for the teacher, despite their desire to support students.

Kayla compared Black female science teachers to a "skeleton crew" manning a deteriorating ship of people who are just trying to deal with the craziest storm ever. She used this analogy to explain how she constantly felt that changes in her classroom were being thwarted. Kayla also did not believe she was set up for success because of the large classroom sizes she had to contend with at her school and where students are not always at grade level. She believed that reduced class sizes would drastically help with classroom room management and also help

more children to achieve academically. Her ideal classroom size was 20 students. However, Kayla was aware that class size reduction would mean schools would need to hire more teachers; more teachers would mean more money, at a time when additional funding for schools was in short supply.

When asked why she thought so many Black secondary science teachers were leaving the profession, Kayla reinforced the concept that if a person has a degree in the sciences, they could get a job in a lab or doing research, where one is not required to deal with the daily environment of teenage hormones and attitudes. She disclosed:

> I could get a job at a lab and make twice as much and not have to deal with this. So why?. . . It's really just like there's not enough money, there's too many kids, there's, you know, our technology sucks – the technology sucks at our school. But all those little things I can work around. . . . It's just emotionally very tough.

She also noted that when she would hit a low point with her students, she would think: "Wow, well you guys, you're teenagers. You just don't give a shit about me. Here it is. I'm doing all this work." In this time, Kayla felt unsupported by the school and the students, which made teaching in tough conditions even more difficult.

Kayla believed that making science more accessible to Black females before college would make a huge difference in inspiring future Black females to become secondary science educators. She stated that she loved science in elementary school, but no one in her life fostered that love, not even her family. Kayla was pushed into piano, dance, and sports, but never science. She hypothesized that if you provide access to STEM early in a young girl's life, then more Black females would gain confidence in math and science fields. Additionally, she felt that

recruiting more Black females into the secondary science teaching profession would be easier if schools actively worked to identify Black females taking STEM classes who were also nurturers and assisting them to connect to the field of education. Kayla recalled that her undergraduate experience with science was a "weeding out" process due to the competitive nature of science.

Kayla believed it would be hard to systematically think of what could be done to better recruit and retain Black female teachers because her ideas came from her own unique perspective. However, the major issue she identified in the field of education was that a lot of bureaucracy and societal standards are perpetuated in the classroom. For example, Kayla said, "Teaching isn't cool. The stagnant nature of the bureaucracy around us, even though our social, um, evolution is happening so quickly." Kayla believed one of the biggest contributors to retaining and recruiting Black science female educators is a higher wage. She gave a specific example of the "perfect amount" based on her knowledge of the entertainment industry, because she believed that she is on stage in the classroom:

> If you think about somebody who is on television, right? They're on TV for, let's say an hour a day, and they get paid however much they get paid. For that hour a day that they have to retain, or that – that they retain people's attention, right, that hour a day, how many hours do they technically do that? Hmm, maybe 12 episodes, maybe 20 in a season, right? Twenty hours – that'd be – whatever they get paid for those 20 hours is what we should get paid for our 20 days of whatever we do. And then multiply it by however many days that we actually do that same thing.

Kayla believed that if teachers were paid based on their ability to retain their students' attention each day of the school year, perhaps more would stay in the field.

Charlotte

They want you to work these miracles.

Charlotte grew up in a predominantly White suburb right outside of Houston, Texas. Charlotte was mostly taught by White female teachers and never had classes with other Black students. She described her family as traditional, and she grew up knowing she would go to college. She went to college but did not know what she wanted to do when she got there. However, she eventually decided to pursue a business degree. She started working at the Verizon Wireless corporate office as a customer service representative right after her undergraduate graduation. Charlotte did not like working at Verizon because of the interactions with customers, so she found a new job working at Farmers Insurance as their claims associate. She did that for about three months, before she went on to became an account manager for Travelers Insurance.

Feeling confused about her career choice, Charlotte spoke with her best friend, a Black female history teacher, who told her to try teaching to see if she would like it. Therefore, she registered as a substitute and started subbing in computer applications classes. Charlotte went into a teaching certification program called Texas Teachers, took the exam for technology education, and enrolled in about six lesson planning and classroom management courses. She finished, got certified, and then became the teacher of record at the school where she was substituting. She later moved to Los Angeles and was teaching computer science, digital arts, and AP Computer Science.

Since Charlotte grew up in the predominantly White suburbs, she initially thought she wanted to teach in a district familiar to her own.

> At first, just because of where I came from, I was thinking okay, I just want to do the suburbs because I don't really – I mean inner cities I don't really know about that. But then um um the district that I got in, it paid the most out of Houston. So I knew that they would hire – like my chances of getting a job would be higher. They offered more money. And then once I got out there and I started teaching I did – students would tell me, "Oh you're like the only teacher I see that looks like me." So that was something that did give me – like 'cause it didn't even hit me when I first started teaching about that. And I thought that was a big deal to me because it's just the – 'cause a lot of times with these kid – with these kids in their environment it's like of course on TV and stuff like that when they see people succeeding, it's not someone that looks like them. I guess 'cause growing up where I grew – It's like you really weren't – It was kind of like I was like out of touch. Like these students face issues that I never could even imagine. And so it is like being a role model for them, someone they can see.

Since transitioning from the corporate world into the education field, Charlotte has found work more meaningful. Charlotte's connection with students was one of the key reasons she stayed in the field. She liked working with students because every day is different. She knew that teaching is not like working in corporate America where you're just sitting behind a desk all day. Charlotte also liked that she gets more vacation time in education, compared to other fields. Currently, the pros of staying in teaching outweighed the cons, but she was not sure if she wanted to stay long term.

Although she enjoyed teaching, Charlotte noted that the burden and pressure of helping students below grade level reach grade level often led her to think about quitting. She described

feeling frustrated about the lack of support teachers get when they have students who are struggling. “If you have this student that is like failing all their classes,” Charlotte described, “but yet you come to the teacher and like the last month of school and talking about, ‘Okay we have to do something to pull this grade up.’ Well where were you these months prior?”

Charlotte also believed that salary played a major role in influencing whether a Black female science educator wanted to stay in the profession, because they have desirable 21st-century skills that many employers are looking for. She elaborated that if she had gone to college for computer science, she didn’t think she would be in the teaching profession. Charlotte knew that teachers who had these skills were getting paid much less than if they were working in corporate America. She believed that low salaries are a clear indication that educators are not valued in this country.

In addition to the low pay, Charlotte cited the overwhelming expectations teachers face from administrators. These expectations include lesson plan submissions, grade deadlines, tutoring commitments, and so forth. Charlotte felt that teachers were under tremendous pressure from administrators to turn around struggling or failing students. She explained:

> You have to constantly work with students. Like for teacher wise you can’t have a high percentage of failures ’cause then they look at the teacher and feel like you’ve done something wrong if you have a high percentage of failures. So, then they want you to do all this overtime tutoring and all this stuff to help the students that are failing. But then if they’re failing and not coming to tutoring what then? And it’s like they want you to work these miracles. So that’s what I mean when they – like valuing the teacher. It’s like

everything's on the teacher. And it's like they don't put some of the responsibility on the student or their parents.

Charlotte said that if there were teaching jobs where the administration backed teachers and made them feel valued and where there were few classroom management or discipline issues, she would continue teaching for the next 30 years. She even expressed that if those issues were changed, regardless of whether or not her salary went up, she would stay in the teaching profession. After all, her boyfriend supported them financially, and she had about six friends who were teachers who provided emotional support. She just felt that she needed that same support from her school administration.

Charlotte even debated leaving the teaching profession to become a counselor. "As a teacher you hear a lot of stories," she said, "kids come and tell you a lot. And they'll tell you what's going on in their home life. And it's like you are kind of – sometimes you can play that mother figure." This connection with students was what kept her in the field, but she continued to long for advancement. She believed that if you want to retain Black female science educators, then there are going to have to be structures created to allow for professional growth into administration. Along these same lines, she wanted to see more education policymakers who have actual teaching experience. She noted that most education policymakers have never been in a classroom. She felt that many policymakers lack empathy for what it really takes to be an educator in 2018. Charlotte believed that unless you've been in a classroom, you can't judge teachers. Additionally, she wanted like to see equal professional opportunities for all teachers, regardless of race or gender. When asked to expound on that, she stated, "So let's say they were in a classroom, but they're a White male, and they said teaching was great. They moved up

immediately. They didn't have no problems. They taught all the AP classes." She expressed that these type of growth or opportunities do not usually happen for Black female science teachers.

Charlotte felt that Black females are the ones carrying the burden for most of their Black students. This is because most Black students don't feel like anything will ever change in regard to their needs, so they never go to administrators for help. Charlotte also thought there was a huge difference of opinion on disciplining Black children. She expressed that even though Black female teachers usually carried the burden of disciplining Black students in a school, that work was not generally recognized when moving up the career ladder for leadership positions.

When it came to teacher recruitment, Charlotte believed that Black females should be targeted and identified while they are in college. She hypothesized that if you target science majors who had not yet decided what they wanted to do once they graduate, then you could recruit them into teaching. She gave an example of one of her close friends who teaches chemistry because she loves science. Charlotte stated:

> She didn't know what she wanted to do with her degree. She just knew she loved science and so – and that's when she thought "Okay, I can go into teaching" 'cause she loved science so much. So it's just – I think if you grab them like their freshman year, starting off when they're first coming to college 'cause that's really when students don't really – may not know what they want to do.

Charlotte repeatedly emphasized that she stayed in the teaching profession because of the relationships she has with students. She noted that if you focus on meaningful relationships with students as a selling point to Black females, then they might be persuaded to join the field. She

gave an example of a student who was about to drop out of college, but Charlotte continued to mentor her, and the student graduated in the top 10% of her class.

> I think that with females, I think just 'cause um we are more of like nurturing versus male. So I think that's a good part for recruiting. And all the time – I think with females it's not always about the salary. Um so if you're doing something that's meaningful I think that would be a way for recruiting.

Overall, Charlotte believed deeply in the importance of making a difference in a child's life as a driving force for why she stays in the field.

Janet

*The Black woman was the first teacher***.**

Janet currently taught exploration and the health careers, AP chemistry, and honors chemistry. She had 22 years of teaching experience, having taught biology, physiology, and zoology as well. Janet's mother was also a teacher and her father was an engineer. The importance of education was emphasized in her household because of what it did for her parents, which greatly influenced her decision to go into education. However, she did not go into the teaching profession immediately after graduation; she took some detours first. Janet described her trajectory in the following way:

> I did get a lot of experience, um, before going into teaching. So I worked – I worked in doctors' offices, some medical doctors' offices. I worked in a dermatology office. And then because I think that was like my first, you know, medical job. And let's see, prior to that I worked in – I worked for the Department of Justice. So I worked with the Department of Justice, I worked in the Bureau of Prisons, in the federal prison industries.

> I worked in the electronics department. So the way the Bureau of Prisons works is – I worked in their labor force. So their labor force, you know, in the prisons, which we all know they're factories in there. And in the factories obviously they produce products. And they have different products in different locations throughout the United States.

After exploring a variety of other career paths, Janet ultimately joined the teaching profession, because of the rich history of Black women as educators. She noted that Black women have been the pillar of the Black community; they have been teaching before the teaching profession was ever created.

Janet told the story of how Black women have been educators since plantation times. "People don't realize or people don't tie in to Black women being educators because I think they think it's negative because of some of the negative images as far as being a nursemaid," she noted. Janet explained how slaves who were nursemaids would be forced to "get pregnant at the same time that somebody in the big house was pregnant so that they could be nursemaids for the baby." She further explained, "But then some of – some of the Black women were taught to read and about the Bible . . . because they were the ones that had to teach the kids." Janet saw this as "the birth of the Black female as an educator." It was "their job was to teach the kids in the big house." Janet described how these Black women would teach and spread information to others through the use of song:

> Some of them would actually go back there and risk their lives teaching others that were not supposed to have the information, and actually came up with crafty ways to deliver information through the songs that people don't understand, that they're delivering information through these songs, but it's – it's not sung, uh, gospel, but these songs

actually had meaning and messages, including some of the . . . mechanisms and symbols and tools and things that these Black women use to get information across. And a lot of people don't know that. They don't tie the importance of the Black female as a educator all the way back to the plantation.

Janet noted that song was not the only tool that Black women used to secretly teach others on the plantation, describing another "little crafty thing that these women used to do" to spread information.

So, on the plantation the – the Black girls, uh, and – and some Native American girls, they were . . . their hands were always examined to see what type of work they could do. And if their hands were a particular width and length they would go to the knitting mills and the head seamstress would mark these girls with red ribbon in the inside of their clothes because at any given time, if they were young girls, they could be sold off. . . . So they would mark the girls so that if they did get sold, when they went to the next plantation the seamstress would know that they were learning to – to be this thing called a "show way." And a show way was these girls that were in the knitting mills, that worked for the seamstress, that would take the scraps. And I know you've seen these blankets that look like scraps and stuff, but these – these blankets now that look like scraps, especially some of them are pink, they are actually mocks of the real blankets that were maps to the different parts of the underground railroad. And so what they did is they took the scraps out of the knitting mills and that's why those blankets look scrappy. But they would actually place maps . . . and directions to safe houses and things like that on the blankets and they would give them to the – the slaves that were intended on running

away. So I'm just going into that story to tell you that – the extreme ways that Black women, and the crafty ways that Black women have used to deliver information to the people.

Janet wished that more people knew these sorts of stories about the history of Black women as educators. She felt that if more Black women were aware of the "contribution that Black women have [made] to teaching in the community" then perhaps they would be more likely to choose teaching as a career. "I don't think that Black women understand it," Janet said,

> so teaching, when they're choosing careers, is not as valuable – it's not thought of as prestigious or it's not thought of as viable, because they do not understand the history of Black women in education and how Black women were responsible for teaching.

Janet expressed sadness about the fact that the teaching profession is not viewed as valuable, and it's not thought of as prestigious or viable. She continued:

> When we get upset that [Black women] have to teach Black men certain things it's like, hey, you know what? The Black woman was the first teacher, not just for Black men, but for men of other races too, especially little White boys too. The Black lady was teaching them, you know, everybody. So I don't know, I just think women don't understand because if they did I believe that more Black women would at least [consider the profession] . . . So, I just feel like that's the same thing, like, guiding people. It's really the same thing, like showing people ways to success, ways to better your life, ways to escape some of the things that you may feel are going on in your neighborhood . . . and I just feel like it's the same thing, like teaching.

When asked if she ever considered leaving the teaching profession, Janet responded that there have been times that she's thought, "Oh my God, I'm sick of this. I want to get out of here." She sometimes thought of other possibilities, including getting another corporate job downtown or returning to the work she did in Washington, DC, in the criminal justice field. However, she explained that her lifestyle had changed from the days when she was single and working in the corporate world. "Now with a husband and a family, how would my lifestyle look? Would I be more stressed out? Would I be available for my son?"

When weighing the pros and cons, Janet ultimately decided that she liked the benefits that came with teaching. The biggest pro was the breaks she got between 10:30 a.m. to 1:00 p.m. "Every conference period I can leave," she said, "so those days I'd leave and go to my son's school and take him lunch. So, every Wednesday I would go with these big, fancy, you know, lunches for him." After all, Janet had already worked in corporate America, and she knew how difficult it could be to maintain the energy it took to live the fast-paced corporate lifestyle.

Janet cited both the pay and vacation time as two of the reasons she has stayed in the profession. Janet, who has been teaching now for over 15 years, was currently making six figures, which was more than any of the other interview subjects.

> The money is good but, you know, when you think about it, number one money is not everything, and number two, you have all of these days off and all of these hours that you work. So, you have time to do something else, like be with your family or, um, make money in another kind of way that may be more valuable, like your own business.

When discussing the idea of a side project or business, Janet mentioned that "other teachers that were career instructors . . . made a living off of being not just a teacher in the classroom." She provided several examples:

> They were writing books; they had small businesses; they had tutoring services. They ran nonprofit organizations; they worked a lot at the school for additional money and stipends and things like student organizations. They did extracurricular activities. And maybe that's what their dream was. Like even at the school where I am now, there's a person who their lifestyle allows them to travel, and they run this huge travel program where they take the kids like five or seven different places.

Another reason Janet continued on in the education field was that she felt that it was her duty to help properly educate the next generation. "I do believe that the majority of people are not educated properly," she said, "which is for me, once again, another reason why I stay." Janet also cited the need to better teach students processing skills and life skills, including business etiquette.

Although she remained in the profession, Janet understood why so many Black female educators were leaving the teaching field. She felt that most people did not understand or were not aware of "the prestige and the importance of what it means to be a Black educator." She mentioned a Facebook page, *A Black Educator's Blog,* which she liked because it harkened back to the "prestige and the camaraderie" and "legitimacy" of seeing education "as a serious profession." She felt that it was important for Black women to have resources like this blog because many of them do not have exposure to or understand what it means to live the life of a teacher. She cited that lack of exposure as one of the possible reasons why Black women are

leaving the profession. For education to be seen by the outside world as "prestigious," Janet noted there is a need for higher teaching salaries, which could greatly help with teacher retention. She also felt that smaller class sizes could help "so you can actually teach."

Janet also spoke about why many Black women with science degrees would be hesitant to get into the field. She talked about her own struggles of having to lesson plan for labs, lab lectures, and science classes, something that is unique to science educators. "So now you have this lecture, and you have a lab lecture, and then you have the labs," she said, "so that's actually three different types of, you know, layouts. That's a lot." She also added that it was difficult for many of her students to keep up with all of those labs and classes. She gave an example: "They're like, 'Okay, wait, what? Today what are we doing? You were talking about it a little differently yesterday' Well [yesterday] it was textbook day. So now this is the lab. Now I've got to see what you can do."

Janet also felt that Black women with science degrees would prefer to get a job in a more comfortable environment, one where they would not have to worry about disciplining students who act out. She noted that disciplining students could be particularly difficult in the science classroom. About this she stated:

> The kids are already rude – nobody's going to put up with that . . . nobody's who's spent all this time in – you know, educated science – getting science degrees, that's hard work. . . . Why should somebody who majored in chemistry, you know, deal with that where they could go get a job at Amgen? [You] don't want 40 people to a classroom [with] behavioral issues, while you're trying to – with chemicals and knives with – you know, nobody – nobody is going to be teaching science in any type of chaotic situation.

Janet also affirmed that, on top of all that, student discipline often tended to be the burden of Black female teachers. “A lot of social dysfunction of – of our community spills into the classroom,” she said. While not everyone can handle student discipline, Janet describes herself as “one of the toughest teachers on campus.” This perception of being tough did not bother her. She was just not intimidated by the students. This was an important factor because Janet believed some teachers, specifically White teachers, were intimidated by students of color. Janet experienced students in her classes with behavioral and/or discipline issues. Oftentimes, she felt that educators end up having to do “a lot of [child] rearing in the classroom.” She felt that parents are not always teaching the life skills and etiquette that children need to be successful in school. As an example, she mentioned students who try to get up in the middle of class to leave or walk around. “You can’t just get up and walk around my class,” Janet stated.

When asked if she had any strategies or ideas for recruiting the new generation of Black females who may not have grown up seeing education as a prestigious career, Janet had a few answers. She thought that the most important strategy would be having open and direct communication with Black community members. Janet felt that the responsibility for recruitment and retention should fall on the school districts themselves and the strategies they use to recruit should be informed by the local community. She brought up ideas for hosting “forums, seminars and workshops,” and she thought that connecting with local politicians, including mayors, could also help highlight the significance of teaching to the community.

When it came to the recruitment and retention of Black female science educators specifically, Janet had a few other ideas. “If science teachers could really have things set up like how it really is in the industry, I don’t think they would miss the industry so much,” she noted.

She described how her own classroom had "a lot of machinery," which included "things that you could see in a real lab like Amgen . . . bacteria cultures . . . an incubator, a centrifuge, an autoclave." With an abundance of science equipment, Janet felt that science educators could really be innovative and their students would appreciate it as well. Furthermore, because Black female scientists could make more money in virtually any science field other than education, Janet thought that providing additional financial incentives could help with both recruitment and alleviate the retention issue. "At one time the district that I am in, they were giving out incentives for math and science teachers," to encourage people to enter the field. Given the success of that approach, Janet firmly believed that recruitment incentives are important.

Incentives were not the only idea Janet had for school administration to solve the issue of recruitment and retention.

> I think [they] should develop programs for people who are Black, female science teachers to speak to other Black women about coming into teaching. Maybe these other Black women are scientists already or young girls that are maybe majoring in science.

Janet surmised that if school districts could provide mentorship opportunities and financial incentives to young Black women who work in or who are studying in the science field, then some of them might decide to go into teaching instead of pursuing another path, such as going to medical school. However, Janet understood that it took a certain "compassion and personality" to be a teacher; not everyone could thrive in the profession. "So, we have to find them, the ones who care enough to be nurturing."

Ultimately, Janet felt like there needs to be a "reconstruction of what it looks like to be a Black female science educator" if anything is going to change. She stressed that "providing some type of empowerment" and "structure" could create a

> cultural shift where the Black female educator is hailed in a different light" like the way it used to be. I'm telling you, [in] my mom's era, there were a lot of – of females in education. There were principals; there were professors. Going back means being truthful about some of the politics that got us here, such as Brown vs. the Board of Education.

Teyana

I' m a Hidden Figure.

Teyana was born and raised in Los Angeles. Her father was Dominican and her mother was African American. She grew up with primarily her mom's side of the family in California. Her mom was a teacher, her grandma was a teacher, her aunt was a teacher, and her great aunt was a teacher. She graduated high school at 16 and went to Pasadena City College for 2 years. Teyana chose to graduate early and moved to New York about a week before the 9/11 attacks. She lived only four blocks from the World Trade Center, so Teyana was asked to evacuate from her housing. While going through her luggage, she found the address book her mother had given her. It had the address of her great aunt on her dad's side of the family, who lived in Brooklyn. It was the first time she had met her father's side of her family; and it was then that she discovered that her great aunt on her father's side was a teacher as well. Teyana felt she had teaching in her blood.

She eventually was able to go back to her university. Teyana started working at the 92nd Street on the Upper East Side, went to college downtown, and got accepted into organic chemistry research. Teyana described her favorite professor there:

> My organic professor at the time, named Dr. Cohen, now her name is, uh, Dr. Rizzo, she was Hawaiian, female. She was the first like, uh, she was the first minority woman that I had ever really experienced in chemistry, or in science really. And she was dope, you know? So, I was like, "Okay, cool." You know, "I can hang with this."

Teyana completed 2.5 years of organic chemistry research with her now mentor. They patented with Johnson & Johnson, had three publications, and traveled to numerous American Chemical Society Conferences to present the research they had conducted. Teyana had to support herself in college because her mom was a single mom with four kids, so she started a business while an undergraduate to pay for rent and tuition. She initially wanted to become a doctor, but she took the MCAT her first year out of undergrad and did not get the score she wanted—so, she moved to Atlanta where her mom had relocated to avoid the high cost of New York City rent. However, she did not like the South at all because it was the first time she had experienced culture shock and blatant racism.

She ended up leaving Atlanta, decided not to become a doctor, and instead moved back to New York and expanded the business. After being in New York for another year, she was sick and tired of the cold. Teyana stated:

> I was really just kind of, you know, doing some, uh, how shall I say this? Uh, some self-inventory, just, you know, just checking in, trying to figure out what it is that I wanted.

> Um, and so I thought, you know, my mom's a teacher, my grandma was a teacher, my aunts, everybody in my family is a teacher. It's in my blood; let me try it.

She started teaching in South Hampton, New York, on a reservation. She spoke of a student who reminded her of her brother because he was hungry, teachable, listened, and wanted more, who inspired her. She then moved to Brooklyn and started substitute teaching at an all boys' school in Bedstuy.

At the same time, her cousin was doing Teach for America in New Orleans, and that inspired her to look for programs where she could teach. Teyana applied for Miami Teaching Fellows, New York Teaching Fellows, and Philadelphia Teaching Fellows. She was not really into New York or Philly, and so she chose Miami to be on the beach. She started teaching science in Miami Proper. North Miami is primarily a Haitian school, and Teyana felt a Caribbean connection to the community because her dad was Dominican. Frustrated with the teaching community in Miami, where she made $38,000 as a science coach for three years, she went back to the Hamptons to find herself. After much reflection in the Hamptons, she decided to move back to California. However, California did not recognize her Florida teaching credential, so she could not get a teaching job. Teyana went back to school and completed the LAUSD intern program to become a teacher, all while supporting her little brother and working as a private tutor in an affluent neighborhood. She now teaches chemistry and honors chemistry, but in the past has taught health and biology.

Like the others interviewed, Teyana stayed in the field because of the students. She stated:

> They drive me nuts. I can't stand them sometimes. They push my buttons. I real – they are – they trigger me. Like legit they trigger me and they push me to the point to where I think I'm going to lose it sometimes. But I think that isn't that what kids do, you know, is the highs are very high and the lows are very low and somewhere in between, you know – well, not somewhere – somewhere in between; I think all in between all of that is just love. Um, I mean like we did ice cream lab today and one of my students, I love him to death . . . I mean I had – even just in the class that you came in, there were two ninth graders that came in, "Ms. Smith, we heard you're doing ice cream lab. Can we please – we really – we just – we just want to do the lab. We just want to do the lab. Can we please just do the lab?" "Okay, go clear it with your teacher." I think honestly before I'm a teacher I'm a scientist at heart.

Although she loved her students, Teyana cited the low pay as the main reason why she considered leaving the field: "I'm a single 34-year-old woman, who lives in a one-bedroom apartment, who cannot afford buy a new house. That's a problem." She felt that low teacher pay is a systemic issue "that has nothing to do with the students, that has nothing to do with admin, that has nothing to do with the district." Teyana believed that "if you want to keep teachers in the profession, you have to pay them more, especially in the sciences." She felt that higher pay is the only way to "keep quality teachers that are excited about their . . . subject and their content." Teyana stated, "I do not get paid what I am worth, and that's a problem." When asked what she felt was the appropriate salary for the work she does, Teyana answered, "$100,000 or more. I work so incredibly hard for my students," and she believed she was more than just a teacher to her students. Teyana described this burden of working endlessly to support students:

> I have parents call me and text me . . . I have students call me and text me. [For example] one [student] was just in the back room crying her eyeballs out to me earlier today, earlier yesterday. I'm her therapist. Say I'm not, Destiny. Yeah. But, love you. Okay. I'm right now. I'm their disciplinarian. I'm everything to them, depending on the time of the day.

Teyana feels a special connection with many of her students. "I think for me," she said, "because my last name is . . . and it's a slave trade last name, it's easy – it's easy for – especially when I say that, I – I think it's easier for my students to connect with me." In addition, she felt her Dominican background allowed her to better connect with her Latino students. With laughter, she explained,

> Especially when a little bit of Spanish comes flying out when they're not expecting it . . . and then I think because I lived in New York and I lived in Miami and I've traveled and I – I – and I'm comfortable in my skin . . . I think because I'm first-generation born it's easy for me.

Teyana noted that this connection she had with students was both a blessing and a burden. To illustrate this point, she shared a story about one of her former students, a young woman named Shelly:

> Shelly had me her 10th-grade year for Honors chemistry. Shelly, the summer between her 10th and 11th grade year, uh, went to Vanderbilt and did an internship. She also, the same summer, was accepted to Johns Hopkins for an internship. Shelly came to me, asking me how she could juggle the two. And so I explained to her deferment. I called Johns Hopkins for her, I'm having the conversations because her parents, um, she wasn't comfortable having her parents call or asking them to call, for whatever reason. Language

barrier, not understanding, uh, having – having the academic vocabulary to be able to explain what it is she needs – blah blah blah blah blah. So, I'm making these phone calls for Shelly. I'm not making them between 8:00 and 3:00. We're talking East Coast time; I'm making them at 6:00-7:00 in the morning, while I'm driving to work, with Shelly on three-way, trying to get to work, you know? Um, so Shelly ended up being able to defer Johns Hopkins to the following summer. Um, and now she is going to Columbia on a full ride. She wants to major in biochemistry. So, my mentor in New York at Pace has a – fabulous colleague at Columbia – in the biochemistry department, who is go – who I've already made the connections

When asked about why she thought there were so few Black female secondary science educators, she said, "The pay is a real big one for me. I mean I don't have a second income coming into my household." She cited that her science background could open up doors to careers with much better prestige and pay. "I can go to med school," she said, "I can go back into a PhD; I can go into industry; I can go and get a Masters real quick and go teach at a junior college level and not have to deal with the political stuff." Bringing up the topic of politics, Teyana also described having to tiptoe around certain issues in the classroom:

There is a lot of watch what you say, oh you shouldn't say that, can't be as . . . um, so yeah, I, I mean I think the pay, the political, um, climate in terms of, you know, you can only say so much or you can't, you know, I think the thing about education is, is everybody wants to talk around the pink elephant.

When asked to expand on this, Teyana said, "I think a lot of money is wasted on frivolousness instead of actually going to the students for what it is that they need." She gave an

example of this frivolous spending. “In Miami, I think it was called Power Writing,” she said, “there’s something called Power Writing that all – everything was about Power Writing. It – it’s all the same stuff, it’s just repackaged.” Teyana didn’t hold back her thoughts on these sorts of “repackaged” education trends. “Science is science,” she said, “Everybody cut the shit. Let’s teach these kids, let’s get the chemicals that we need, and let’s stop trying to sell the same stuff over and over again.”

Because of frivolous school spending, Teyana noted, “I spend so much of my own money in this classroom.” Additionally, she found ways to make her classroom supplies last longer. “I’ve been able to kind of figure out how to recycle stuff,” she said, “like for example, as we walked out of the bathroom, I keep my paper towels after washing my hands.” When asked why, she said, “So that my kids can have paper towels when they do their labs.” Teyana is only given one box of paper towels per year with 180 students. Teyana felt that this sent a mixed-message to her students:

> I mean I personally think it’s telling them you – you – you’ve got to figure out how to make something out of nothing and use what you have . . . but, then I think that there’s another side of it – is you’re telling them that they’re not enough – they’re not worth buying another freaking box of paper towels. Buy enough paper towels so that we don’t have to recycle the paper towels from going to the bathroom. It’s ridiculous. But we figure it out.

In terms of recruitment of Black female science teachers, Teyana felt that it would help to recruit directly from the communities the schools were serving. She noted that the high school she taught at was a draw to her because the student body was predominantly made up of young

women of color. “This is my home,” she said, “you know, this is the type of neighborhood that I grew up in and that I come from. And so, for me, it’s – it’s – it’s comforting almost.” However, she also believed fair pay would help the most with recruitment. “You need to pay them more,’ Teyana stated, “Because I don’t get paid enough. I legitimately do not get paid enough, so I have to have a couple of different side jobs in order to make up the difference for—them the resources that it is that—that they need in order to be successful.” Instead of having the teacher pay for classroom supplies, she felt the school districts needed to step up. “Give them the crates. Give them the color-coded file folders. Give them the colored paper to make the world wall, have the students make the world walls. Give them textbooks that are not over 10 years old.”

In terms of retention of Black female science teachers, she felt there needs to be more than just recognition of good work. There needs to be investment in teachers’ goals. Teyana was nominated for Teacher of the Year when she was teaching in Miami. However, with the award, also came extra work.

> I do not know of any other profession where you are nominated for an award and you then have to go do work . . . meaning if you’re nominated for Teacher of the Year you have to write all these essays, you have to answer all these questions so that you can then win Teacher of the Year. I don’t need extra work.

Above all, Teyana thought that investing in teachers’ goals could actually make a difference in retaining Black female science teachers:

> As much as I am community-based and a giver and a supporter and a lover and all that good stuff, and I – I mean I feel like every teacher, every good teacher These are my kids. These are my babies. These are my students. Um, and as much as I wholeheartedly feel

> that way, they totally are, I'm clear that they're not. And, um, I think that in order to retain me, um, there needs to be more of an investment in, um, what it is that my goals really are.

Teyana's goal was to pursue graduate school in science. "We could do a billion other things with a science degree." she said.

Victoria

I just have such a heart for helping people who've been hurt.

Victoria grew up in Long Beach, California, alongside her three brothers. Her parents had her while they were in high school and stressed the importance of education in their family. Victoria's mom and grandma were in STEM-related fields, so she naturally fell in love with science and loved learning in general. However, in college, she felt like she did not belong in the science department—because she was a Black woman. Victoria was nervous and felt that she could not continue in the science field because of the traumatic things that had happened in her past that made her feel "less than." She changed her mind about majoring in science and majored in human development instead. She was motivated to go into that field by her own pain and past abuse. She wanted to understand people, and telling her story helped her heal.

Victoria went into the field of behavioral therapy and started working one-on-one with students who had learning disabilities. As she was working with these students, she realized that she wanted to work in the school setting. Victoria's mentor from church, who was a Black female principal, inspired her to enter the teaching profession and combine her passions. As a result, she applied to a school to be a teacher's assistant and specialized in working with students who had learning disabilities.

Victoria gradually took steps to become a full-time teacher. She was teaching integrated science, biology, and language classes for a year and a half under the special education department. Eighty-five percent of her students had emotional issues or emotional disturbance. Victoria's background motivated her to work with students who have been hurt or have emotional disabilities. Teaching was very personal for her. She explained:

> They don't know how to respond because of past hurts, and so I just have such a heart for helping people who've been hurt, especially when it can be aggressive because I had those moments where it didn't come out so pretty if that makes sense.

Although she loved having a personal connection with her students, Victoria felt like she lacked support from the school administration. Victoria stated that as a fairly new teacher not having constant content support with the transition to NGSS was very difficult. She also craved immediate feedback on her instruction. Victoria said, "I think if I had more of the support, I would feel actually more included to do so, I just sometimes don't know how to navigate."

She also mentioned that the administration did not inform the teachers of what is happening with students ahead of time. She offered this example.

> So for instance, today, um, I had a student who was arrested yesterday and, um, I gotta email from one of the administrators to "Okay, the student's here with the parent and we need work for him immediately," and I'm thinking, "Huh?" And, it was just like, I'm in the middle of a class, like, "Why would you ask me that?" And it was just hard to stop and – excuse me – gather something for him. Mm, excuse me. To gather some work for him to do and take it home or I didn't take it to his house. They were here, but, um, it's

> just kinda like inconvenient, like, uhh, do you realize I'm teaching? I know you know I'm teaching.

She added that interruptions with pull-out services, such as therapy, were also a burden because students missed science instruction. Therefore, when Victoria planned a lab, the majority of students could miss it. This made her feel like all her preparation was in vain.

In addition to the lack of support from administration, Victoria thought the disrespect from students made it difficult to stay in the profession. There were times when she thought, "This is it, God, I just can't do this anymore." Victoria expressed extreme difficulty with a Black male student in her class who had no respect for females and would intentionally sabotage labs. She noted that she put in overtime to make sure that students have hands-on labs, and she felt that sometimes the students did not appreciate it. However, as she prodded deeper, she discovered the Black male student had been abused by Black women in his family. Even though she discovered the reason for his disrespect, the emotional servant aspect of her job was still a burden and could be discouraging.

However, as a Black woman, Victoria strongly believed she had to keep moving forward. Of this, she said:

> You have to learn how to bounce back and adjust and deal with it, as a person, and, um, I realize, too, uhh, from my mother, she said, like, when you're dealing with hardships, people are watching you. Even like some of the girls in my class – and it's – it's so funny. They're so hilarious but, like, how they might, uhh, indirectly pick up things off of how I respond to things because, quite naturally, we do learn based off of things in our environment.

In addition to enduring disrespect from students, Victoria carried the burden of being a role model to the Black female high school girls. The majority of the girls came to her to discuss her life in high school and for motherly support, in ways they did not go to their White teachers.

Victoria knew from her own experience and from the experiences of her Black female friends that they had dreams beyond teaching, such as starting their own business or hair care line. Victoria noted that the teaching profession doesn't always make a teacher feel appreciated, especially with outside family stressors that a Black woman is already carrying. She wished there was a way to feel more empowered, to work for herself, and to have more control over her life.

Victoria mentioned that, in the Black community, she felt that Black women have a lot of responsibilities and have a lot of control, but in teaching, Black women are often told what to do and stripped of power. Victoria proclaimed,

> I think that you know, unfortunately, I just feel like Black women are seen as, like, the caretaker in some way and that's – I don't mean to take it back to slavery kinda thing but I think that we just – we're always seen as the provider. In a sense and it's really, really hard to be the provider but then still be your own person and do what you wanna do.

Victoria repeatedly mentioned that she didn't feel her White female coworkers understood her plight. For example, a colleague told her, "You know maybe you should take, like, two years off because it's just, like, you're just so stressed out all the time." She expressed how frustrating that was because this teacher was financially supported by her husband and was working by choice and not necessity, while Victoria was the financial provider for her family:

> Uh, my father died two years ago, and my mom was in the hospital back in December, and I had to take care of her, and it was so hard. Then I had to help my brother pay for his

college education, and then I'm paying for my own education, and then I have another brother who is having difficulty making rent in place, and he has a child, two children, so I'm helping him sometimes pay rent. Recently I helped him pay rent and then I had another brother – I have brothers.

She stated how difficult it was to "pick up the slack" and come to a job that is emotionally draining. Victoria felt that it is hard to be a Black woman who is expected to always "hold it down."

And it's so hard, but um – but I think, uh – people who go into the realm of teaching, you have a heart in some way to impart knowledge, but you care, like you genuinely care about other people, and that – I feel like it's a double-edged sword. Like it can help, but then sometimes it's hard because you can overextend yourself and I think as women we have emotional qualms, like, okay, I wanna help you and I think a lotta times because Black women have readily been available to help. It's like they're seen as the independent person who doesn't need the help but I think there's just a lot of, again, responsibility on Black women as a whole and so, again, if they have – if Black women have – left, it – it makes sense.

Victoria believed if there were greater opportunities for Black women to focus on themselves and go back to school for additional learning to better themselves, it would help with teacher retention. She also believed that if Black female secondary science teachers were paid more, they could be retained because they financially supported more than themselves. Specifically, she would like more professional development support.

I would rather – have more professional development in how to teach Science better and how to implement more hands-on activities with the textbook given to us . . . because I have – I know – I've done this. I've seen it. I can do it and then here's the book, but I don't know how to bring them together a lot, and it's hard if that – I don't know if that – makes sense at all.

Victoria, however, stressed that her interactions with students were what keeps her in the profession. She expressed that she enjoyed the moments when students were able to understand something and really get it.

So my students can come off rough around the edge, and just seeing now that they're – they know – where my expectation is of them, like, even verbally, I don't like profanity in my classroom, and so if all I have to do is give them not like this mean look, but just look at them and say, "Hmm," and they're, like, "Oh, I'm sorry," but they are starting to realize and I said, "Look, you can do that in your time but you're in an academic setting and you cannot act the same way when you're outside with your friends and when you're in a classroom setting."

Victoria believed that Black girls need teachers to connect science to things that are personally relevant to them. For example, in cosmetology, it is required to take a basic chemistry class and understand the physical and chemical changes of hair products.

I mean we're more than just hair and makeup, but um, like, speak to her. Get on her level, know where she's at and meet her there, um, and I think, too, as teachers, we have to be careful how we bring things up because we're bringing in our natural bias. Science is like uhh, hmm, it's almost like this dream instead of something real. Like, oh yeah, look at

these people back in the day who explored and did all of this and it's almost like a distant thought or memory but it doesn't seem like, "Oh, could I do that today?" You know what I mean?

Moreover, Victoria didn't believe science was made tangible for Black girls. She suggested getting books that are updated with current science inventions and culturally relevant inventors.

I mean you always hear about stuff that was discovered back in the 1800s but, like, what's happening now? Like today's April 28th, having something that's more relevant, those books, like, 8 years or so, but something that's happening now, and things that come with supports, and, like, I don't have a hood or anything like that. I don't have a refrigerator. I mean I don't. This is um having the support to teach the topic, the textbooks, just updating information I would say. Well, I think that if you really want more Black women teachers you'd have to really put something out there for them to want.

Victoria also believed increasing pay would recruit a more diverse teaching field. She gave an example of the nursing field, where there was a shortage of men, and, as a result, a pay incentive was given to men who wanted to pursue nursing. Victoria also noted that once the Black females are recruited, you have to make them feel included. "We can all do science and not making Black women feel like oh, you know, stay over there and just do your – teach your – one class but don't try to explore or do anything else bigger or greater." She believed there needs to be a component in teacher preparation that infuses cultural awareness into the science curriculum. She noted that she always saw old White men who created something or did

something, but she never saw a Black woman. If Black female scientist were included in the books, then Black girls would see themselves as scientist. She affirmed this by saying:

> I mean (we) have them see things that Black women have contributed or how they have contributed in some way to the field, you know? I just feel like there's this natural, uhh, just turn to look only at what older White men have done and you don't see the things that other Black women have done. Uh, you just don't see it, um, you just don't and I don't think Blacks just need to be informed. I think everyone needs to be informed because they – they meaning, like, typically for me – White men and where I went to school at least, it's, like, they see one thing and they don't accept anything else, you know.

She strongly asserted that if everyone in science did not see Black women as scientists, then it would perpetuate the stereotype of Black women not being capable.

> I think there needs to be a little sensitivity, in my eyes. I think you just have to understand, like, who you're dealing with, like, we're – we are not in the sciences, you know? There's not a lotta science. Like the woman who encouraged me to go into teaching and science, she's not even a science teacher. She was never a science teacher. She was um a middle-school, uh, history teacher and then she became a high school – no, an elementary school – principal and then she started working for the state of California or something like that but it was, um, you know what I mean? There's just not – they're not – there and no one – well most people don't know how to bridge that gap

Mary Jane

Sometimes, the fight is too much.

Mary Jane emigrated from Belize to the United States with her family when she was 4 years old and had lived in California for most of her life. She had been teaching at the same school for 17 years. Her specialty was marine biology. Mary Jane initially wanted to be a doctor when pursuing her biology degree, but she came to a different realization after a biology internship at the county coroner's office, where she assisted with autopsies. She realized that making a medical mistake could cost someone his or her life and decided not to take the MCAT. Mary Jane did clarify that when educators make mistakes, it might be more damaging because "people have to live through those mistakes," but a mistake leading to the end of someone's life was not something she was comfortable taking on.

She continued to pursue her biology degree and worked in the lab of a professor who was also the coordinator for the Los Angeles Collaborative for Teacher Excellence. The professor encouraged Mary Jane to help with a STEM day to help make STEM accessible to middle school kids. Mary Jane became enthralled with the process and fell in love with the field. As a result, her professor encouraged her to apply for an internship at a local aquarium to write science curriculum. Mary Jane stated that without the push from her professor, she would have never thought about going into education.

Mary Jane started substitute teaching after she graduated, and then went to a job fair where she received three job offers in one day. She decided to teach at a school that specialized in STEM and making STEM accessible to underserved youth. Mary Jane created a marine biology program at her current school and oversaw the implementation of it. Mary Jane complained that other teachers, specifically White teachers, do not always do the curriculum service because, she thought, they do not believe the students can achieve. "I just feel like the

advocacy for our students to truly experience the curriculum is not there because if you as a teacher want it, I feel like you can make it happen." Mary Jane currently did not teach marine biology, even though she started the program. Instead, she taught two Advancement Placement and two general biology classes.

One of the things that motivated her to stay in the profession was that she had had the same supportive principal for 14 years. However, her principal had recently left the school. Mary Jane mentioned that she has thought about dropping out of the profession because "sometimes, the fight is too much." She continued her thought, stating, "There's a lot of people, you know, doing far less, and you become the bad guy just for – I don't want to say demanding that they do more, but even articulating that what they do is not enough."

Mary Jane mentioned that she goes above and beyond for her students. For example, she drove to a college on Sunday to pick up college science equipment so that her students can be prepared for postsecondary science. Mary Jane also required that her students make a science resume, which ensured that even if they do not want to go to college, they still have entry-level skills that are marketable. In this way, Mary Jane encouraged her students to think more about skills for their future.

> Here – you don't have to do an entry level McDonalds/Walmart job . . . I mean, I did, but that doesn't mean our kids have to, right? [I tell students] you can get an entry level job at a medical facility, and some of these medical facilities will even pay for your-your college degree or your books or stuff like that once you get in the door. But you need to have skills and be able to sell yourself in those areas.

Mary Jane was department chair, but that did not change her approach to teaching. She said,

> I don't ask anyone to do anything that I don't do myself. If I'm teaching ninth grade, they're dissecting frogs. If I'm teaching marine, they're doing sea stars or squid. If I'm teaching AP, they're doing pigs. So, I'm doing dissections every year regardless.

Mary Jane did not understand why some of her colleagues were not working as hard with their students. She believed that educators working with underserved students must work harder than other educators to guarantee that underserved students receive an equitable science education. "So, sometimes, it just gets tiring. I'm like, does it always have to be me? Do I always have to have the torch?" This emotion prompted her to explore options other than teaching, such as researching in a lab. She loved teaching, but was frustrated by the politics:

> No one wants you to point the finger and say, "You're not doing what you're supposed to do." But, you know, no one wants to accept the fact that inner city kids require more because of their status and social capital. They have very little. You know, they're rich in very – in many ways, but when it comes to stem – come on. Most people that are in the STEM field make lots more money. And if they were making that money, they wouldn't be impoverished. So, the reality is – those fields are not flourishing in our community, so how do we help these kids to feel like they can be a part of this field? It's – it's just frustrating.

When asked why Black female secondary science teachers were not staying in the field, she explained, like many of the other interviewees, that having a science degree allows one to make more money almost anywhere other than in education.

I mean, I have to have – I have three degrees and a credential in order to make a decent wage. And I'm close to six figures every year, but not quite there, you know? And like, you know, we've spoken before – after 17 years of teaching, had I been in any other field and given 17 of my years, you know, my salary would definitely be – as a person with a Bachelor of Science degree, my salary would definitely be past six figures. And so, the reality becomes with the stress, the fight, and the opportunities to make way more money in industry if you have a BS – education is not appealing.

Mary Jane also believed that the biggest contributor to staying in the field was the supportive administrator she had had, who would tell her, "Do whatever is best for your kids." Mary Jane added that "with that type of support, it's like. . . you can take on the little battles." She visibly cried as she described the difference between the new administrator and the old one. She stated, "I feel like our-our new principal – his heart is in the right place. But I don't think I could keep the fight going. Like, you know, um, I think I'm tapped out, you know?" In addition to being the department chair, Mary Jane ran the senior mentor program and the robotics team. She was also the executive vice president of the PTSA, the PD Coordinator, and the LA Sharers Donation Coordinator. Despite taking on the additional work and responsibility, she did not get stipends for the extra work.

Mary Jane stated that not having a work-life balance was exhausting and negatively impacted her personal life because she has two kids of her own. She wanted to pass the torch to someone else, but she did not feel like others were willing to carry it.

So, it's kind of time for other people to pick up the torch, but when you pass the torch, people don't have the same passion. Like, I just found out before I left that I advocated

for this guy to get a stipend to be science fair coordinator because I wanted our kids at the county fair – we're at the county fair every year. I just found out – he did not send a single kid.

Mary Jane strongly believed that to retain Black female secondary science teachers there needs to be a higher salary, a supportive school environment, and an environment that is supportive for teacher growth. In terms of recruitment, Mary Jane recommended loan forgiveness, higher salaries, and promoting programs like Teacher Next Door, which allow teachers to buy a house with down payment assistance. She also stated that allowing teachers to write-off their interest on their loans, no matter what their income is, would help incentivize education. Mary Jane concluded that the best way to support new Black female teachers in science and recruit new teachers is by having a mentorship program just for Black female teachers, where the issues that are important to them can be addressed.

Summary of Themes

These narratives of the six female Black secondary science teachers provide a glimpse of the experiences and issues they faced in the teaching field and the agency they demonstrated to counter the burdening environment that many of them had experienced in different ways during their career. Several important themes can be gleaned from the interviews with participants for this study. These themes include: (a) ***Incentives***, but specifically better pay, will increase retention and recruitment; (b) ***Investment*** in an environment conducive to professional growth will help recruitment and retention; (c) ***Relationship with Students*** as the driving force behind teacher retention; (d) ***Burdens***—emotionally, academically, and disciplinarily—is directly affecting retention; (e) Black female secondary science educators ***Feel Undervalued*** in the

education field, compared to the science field; (f) Black female educators *Provide Inspiration* for other Black female educators to join the education field; and (g) Black females' *Length in the Classroom* related to differences in the way participants reflected and spoke about their experiences.

These themes will be explored in the next chapter. The aim of this discussion is to offer recommendations that can effect change and better address the needs and representation of Black female secondary science educators in the hope of producing an emancipatory recruitment and retention process. Recurring themes in participant stories will be linked to the literature so as to further illuminate the phenomenon of Black female secondary science teachers.

CHAPTER 5

DISCUSSION AND ANALYSIS OF DATA

There is an absence of Black teachers' voices and a need to examine the science teaching force's recruitment of Black teachers from their own perspectives. This study sought to promote a shift in how we think of the teacher recruitment process by providing a place for Black science teachers to name that world, so we can move toward creating a more just and emancipatory recruitment culture within schools. A more just recruitment process can lead to more Black female teachers entering the field and potentially increase the number of Black females entering and remaining within the science teaching force.

Findings

The narratives in this study yielded seven emergent themes regarding the Black female science educator experience. These were discussed from the perspectives of a range of teachers, from novice to veteran, based on their own experiences. The six themes include: (a) Incentives, but specifically better pay, will increase retention and recruitment; (b) Investment in an environment conducive to professional growth will help recruitment and retention; (c) Relationships with students as the driving force behind teacher retention; (d) Burdens—emotionally, academically, and disciplinarily—is directly affecting retention; (e) Black female secondary science educators Feel Undervalued in the education field, compared to the science field; and (f) Black female educators Provide Inspiration for other Black female educators to join the education field; and (g) Black females' Length in the Classroom related to differences in the way participants reflected and spoke about their experiences.

The investigation of these salient themes attempts to address why Black female secondary science teachers are missing in action. Villegas and Lucas (2002) asserted, "Schools are far from being the impartial settings they are believed to be. Built into the fabric of schools are curricular, pedagogical, and evaluative practices that privilege the affluent, White, and male segments of society" (p. 22). Therefore, I use the theoretical frameworks of Black feminist thought, critical race theory, and critical pedagogy to help contextualize and center participant voices and to name the world for those who have often been missing in the work of recruitment and retention.

The narratives tell an emancipatory story because, as Victoria shared, Black women in education often feel stripped of their power because they are consistently told what to do. This feeling is consistent with the literature stating that many Black teachers do not feel respected or empowered (Deruy, 2016). Moreover, the narratives serve as a lens for considering the Black female experience as STEM educators, particularly the difficulties they face. However, the narratives also provide a glimpse into why educators have stayed in the profession. In decolonizing the field of education, Darder (2014) asserted, there must be counter-hegemonic intellectual spaces for educators, so the world can be renamed. To challenge the hegemonic practices that oppress Black females, we must understand how they name the world and how this process facilitates their empowerment. With this in mind, what follows is a discussion of the six major themes.

Incentives

The Black science teachers in this study pointed to the importance of incentives, but specifically to better pay, for increasing retention and recruitment. The National Association of

Colleges and Employers (NACE, 2017) found that, in 2017, the average starting salary for a college graduate was $51,022 compared to the starting salary of a teacher, which was $34,891. The difference was even greater when comparing average salaries in the STEM disciplines to that of teacher salaries in other disciplines. Research shows differential salary increases can improve a school district's attractiveness within the local teacher labor market. It can also increase both the size and quality of the teacher applicant pool, having the potential to increase the quality of new hires (Hough, 2012).

Teyana expressed her discontent: I do not get paid what I am worth, and that is a problem. There seems to be an unspoken narrative in America that because teaching is a public service, teachers deserve better pay, but it is fine that they are not receiving it. Every single participant in this study stated that pay had a direct effect on their experience in the field. All of the participants believed pay impacts retention and recruitment of Black female secondary educators. Charlotte believed that salary plays a major role in influencing whether Black female science educators want to stay in the profession, given that they have marketable STEM skills, which are highly desirable in the labor market. Victoria also believed that better salaries would recruit a more diverse teaching field. Mary Jane recommended loan forgiveness, higher salaries, and promoting programs that provide down payment assistance to purchase a home. She also stated that allowing teachers to write off the interest paid on their loans, no matter what their income is, would help incentivize education as a professional field.

There was an underlying theme of financial burden among many of the Black women in the study. DuMonthier, Childers, and Milli (2016) stated that Black women are likely to care for children, elders, and other dependents and are often financially responsible for their households.

The Black female participants in this study had to support not only themselves but also their families because they were heads of households. For example, Teyana, the "hidden figure," supported her brother, and Victoria was the financial provider for her entire family, which included paying for her brother's college education. Teyana and Kayla cited low pay as the main reason why they had considered leaving the education field. I also left the classroom and moved to leadership in education because the pay was significantly higher and I could help support my family. Mary Jane complained that despite working as a teacher for 17 years, she still made an under six figures salary, which would not happen if she worked in any other field. Mary Jane had her own children to support, and yet she also had the burden of having to purchase school supplies for her students.

Kayla believed that one of the biggest contributors to retaining and recruiting Black science female educators was a higher wage. Janet cited both the pay and vacation time as two of the reasons she stayed in the profession. Janet, who had been teaching for over 15 years, was currently making six figures, which was more than any of the other participants in this study. She also liked that she had the same schedule as her son. The consensus among these women was that teacher pay is important because of the invisible financial burden they carried. Black women need economic security; eight in 10 black mothers of children under 18 years old are breadwinners for their households (DuMonthier et al., 2016). To recruit and retain Black female secondary science teachers, there must be financial incentives to help with the financial burdens that many Black women encounter in their lifetime.

In addition to better pay, a common theme among the women interviewed was access to industry supplies. Kayla stressed that if a person has a degree in the sciences, they could get a job

in a lab or doing scientific research. The science way of knowing is very important to science educators. Teyana even prioritized the title of scientist over the title of educator. Additionally, when Teyana was missing basic supplies like chemicals and paper towels in the classroom, she feared that it sends the message to Black and Brown students that they are not valued. Janet also complained of not having the same supplies that she had in the industry, such as a hood, refrigerator, bacteria cultures, incubator, centrifuge, and autoclave. How can STEM educators teach their subject using only an outdated textbook and no science supplies? Janet felt that science educators could really be innovative with industry supplies if they only had access to them.

Victoria, the first-year teacher, wished for more professional development to teach science and wondered how she could teach STEM to 21st-century students without industry supplies. Victoria believed that Black female science teachers needed industry machinery to feel like scientists. However, the expectation from the administration and society was that teachers are required to do more with less, according to Kayla. These Black female science educators missed the industry science supplies that allowed them to innovate, create, discover, and add to the scientific body of knowledge using their own voices. The science supplies these Black teachers speak of are what scientists in the field use to conduct research, but they were stripped of access to these supplies in the classroom. This created a space where science educators feel disconnected from the field of science, which is their passion and what brought them into the field to begin with.

Investment

The participants in this study believed passionately that investment in an environment conducive to professional growth would help recruitment and retention efforts. Every Black female participant in this study had an inner strength that emanated from her body as she told her story. These women described professional goals that transcended being in the classroom. Five out of the six teachers interviewed had chosen teaching as a second career, which was an outlier variable to my themes, but could be considered significant. The reason this variable could be significant is that the majority of the women in this study could compare and contrast the pros and cons of teaching to another profession.

Victoria believed that if there were greater opportunities for Black women to focus on themselves and go back to school for additional learning to better themselves, it would help with teacher retention. Victoria even referenced her other Black female educator friends who wanted to start their own businesses. Moreover, Teyana echoed the sentiment that there should be investment in teachers' goals that extend beyond the classroom; in fact, she thought investing that in teachers' goals would make the biggest difference in retaining Black female science teachers. Teyana elaborated:

> As much as I am community-based and a giver and a supporter and a lover and all that good stuff, and I – I mean I feel like every teacher, every good teacher. These are my kids. These are my babies. These are my students. Um, and as much as I wholeheartedly feel that way, they totally are, I'm clear that they're not. And, um, I think that in order to retain me, um, there needs to be more of an investment in, um, what it is that my goals really are.

Additionally, Charlotte was even been inspired by her students' traumatic stories to pursue counseling in the near future. Likewise, Mary Jane would have loved the opportunity to nurture her passion of science research. Mary Jane constantly took advantage of science research opportunities during the summer, not only for the financial stipend awarded but also because it guaranteed that she was current with new science methodology, which nurtured her passion. Mary Jane also stated that the biggest contributor to her staying in the field was the supportive administrator who allowed her to do anything as long as it was best for her students. Therefore, she had a lot of freedom in her classroom and could develop partnerships with outside STEM companies.

The literature speaks to the fact that teachers are among the most important determinants of student achievement (Krasnoff, 2014). However, the goals and wants of STEM educators have not been made a priority. The current focus on increasing teacher retention prioritizes professional development specifically around how to become a better teacher by deepening a teachers' understanding, promoting student learning, and transforming pedagogical content knowledge (Shulman, 1986; Weinbaum, Allen, Blythe, Simon, Seidel, & Rubin, 2004). However, the common theme is that the Black females in this study do not want more professional development on how to become a better science teacher, but rather want an environment conducive to pursuing their own passions as scientists.

Victoria, the first-year teacher, asked for more STEM training to become a better educator, but she simultaneously asked for greater opportunities where Black women could focus on themselves. This leads me to ask, is the STEM educator's innovative and creative side being developed? I have often thought about leaving the education field to go back into research, much

like Mary Jane, because I have felt disconnected from the science field and isolated in only learning about education practices centered on student learning versus new scientific discoveries.

If we do not start viewing science teachers in a different light, then school districts will never solve the recruitment and retention problem. STEM educators have a love for the sciences that does not appear to be nurtured in the education field. It is important to focus further research on the topic of professional growth in STEM as it pertains to education and beyond. When teacher professional growth is nurtured, this extends to their work and relationships with their students.

Relationship with Students

The narratives of the six Black women science teachers confirmed their belief that their relationship with students is the driving force behind teacher retention. Charlotte, for example, addressed this theme in the following way:

> At first, just because of where I came from, I was thinking okay, I just want to do the suburbs because I don't really – I mean inner cities I don't really know about that. But then, um, um, the district that I got in, it paid the most out of Houston. So, I knew that they would hire – like my chances of getting a job would be higher. They offered more money. And then once I got out there and I started teaching I did – students would tell me, "Oh you're like the only teacher I see that looks like me."

This echoes the reason these Black female educators were inspired to join the field and stay in the field—their love of Black kids. Research has shown that teachers of color serve as cultural mediators within their community and are more likely to connect with students of color than their White counterparts (Gomez & Rodriguez, 2011; Kokki, 2016). Additionally, teachers of

color enter the profession with deep ties and connections to the community, with a purpose and desire to teach in their own or similar communities, to provide opportunities for intellectual engagement they believe is lacking in their own schooling (Irizarry & Donaldson, 2012).

Victoria and Charlotte explicitly listed their connection with students as one of the key reasons they stayed in the field. Victoria believed that she connected with the students because of their shared life experiences, which is supported by findings that new teachers of color decide to go into teaching based on their belief that they are impacting students and serving as a role model (Johnson, 2008).

The most senior teacher in the study, Janet, also listed her love for the Black community as a reason why she was inspired to join the teaching profession. Janet felt that it was her duty to help properly educate the next generation of Black students. Additionally, Teyana could only describe the chaos that ensued in her classroom as love, even when she was driven to her wits end. Teyana further noted that if schools could recruit directly from the communities in which they were located, it would help with teacher recruitment. She was drawn to teach at her current high school because the student body was made up predominantly of young women of color. Teyana expressed her love for the community: "This is my home," she said, "you know, this is the type of neighborhood that I grew up in and that I come from. And so for me it's – it's – it's comforting almost."

The sentiments of the participants in this study echo the views of researchers who have argued that the connection to school and community suggests that African American women share unique perspectives on their workplace environment. Therefore, it is imperative to hear

their voices to understand how and why female teachers of color remain professionally committed to teaching (Farinde-Wu, Allen-Handy, & Lewis, 2017).

There is also the belief that White teachers are not connecting to Black children, and this compels Black educators to take up the torch. Mary Jane expressed her frustration with not seeing her White counterparts give their all to help Black students access science. "Sometimes it just gets tiring," she said, "I'm like, does it always have to be me? Do I always have to have the torch?"

Victoria elaborated on how science is not made tangible to Black girls. She suggested updating science textbooks to be more culturally relevant by including Black inventors, which would help forge a connection to the love of science with Black students. Victoria believed that if Black girls can develop the love for science and see their faces as Black scientists, then there would be a connection in the community.

Black women see teaching Black kids as an extension of teaching themselves. Black science teachers are even more compelled to make science accessible to Black students. This is because they know STEM is not always accessible to Black students and that Black girls do not see themselves in science textbooks. Therefore, it is the responsibility of the Black woman who entered science education to make sure Black girls feel like STEM is a pathway for them as well.

The Burdens

In a variety of ways, the narratives in this study pointed to the manner in which the burdens—emotionally, academically, and disciplinarily—directly affected the retention of Black female science teachers in the field. This, incidentally, echoed the Black female television

producer, screenwriter, and author, Shonda Lynn Rhimes's (2017) monologue on the show *Scandal,* where she has Mama Pope say:

> Damn shame. I tell you . . . being a Black woman. Be strong, they say. Support your man, raise your man, think like a man. Well damn, I gotta do all that? Who's out here working for me, carrying my burden, building me up when I get down? Nobody. Black women out here trying to save everybody and what do we get? Swagger jacked by White girls wearing cornrows and bamboo earrings. Ain't that a bitch? But we still try. Try to help all y'all. Even when we get nothing. Is that admirable or ridiculous? I don't know.

Kohli (2016) noted that teachers of color often assume positions of great responsibility and constant advocacy, a burden that White teachers usually do not have to carry. The duty is beyond the typical professional burden of teaching; it is a personal and ethical burden that often results in teachers of color feeling overwhelmed. Moreover, this emotional, academic, and disciplinary burden of being a Black female science secondary educator is often invisible and not praised or rewarded (Rigza, 2016), which the participants in this study confirmed from their experiences.

Emotionally burdened. Kohli (2016) stated that teachers of color who teach in "hard to staff" schools go above and beyond the call of duty to mentor, advocate, and provide a rigorous education for marginalized students. Teyana voiced that she has parents and students calling and texting her to ask questions both during and outside of school hours. Victoria expressed the burden of being a role model to Black female high school girls. The majority of the girls in her school come to her to hear about her own high school experience and for motherly support, in ways they do not go to their White teachers. Victoria wants to be there for her students, but she wonders if anyone recognizes that Black women are already carrying family burdens. Charlotte

has even debated leaving the teaching profession to become a counselor because of the stories she hears. Kayla's emotional connection is so strong with her students that they confide personal issues about their families, such as fidelity issues among parents.

Black women are already carrying heavy burdens in their personal life, yet they are expected to be the Black female pillar at their schools. Victoria feels that it is hard to be a Black woman who is expected to always "hold it down," especially when she comes to a job that is emotionally draining. Mary Jane stated that she has two kids of her own and wants to pass the torch to someone else, but she does not feel like others are willing to carry it. Victoria expressed that she has thought to herself, "This is it, God, I just can't do this anymore."

These Black women are carrying the emotional weight of not only their students' trauma but also their own trauma, as they regularly work beyond 40 hours a week. However, it is an invisible burden that others will more than likely not acknowledge, because they cannot see it. But who is supporting the Black woman? Is the Black woman ever allowed to break down and shout, "I cannot do this anymore," without being perceived as weak? If the Black woman, the matriarch of the Black family, breaks down, who is going to pick up the pieces and make sure that the Black community as a whole keeps moving forward?

Academically burdened. Black teachers traditionally prefer to teach in urban settings, an experience often accompanied by the pressure to raise test scores to keep funding (Evans & Leonard, 2013; Rizga & Lewis, 2016). Charlotte noted that the burden and pressure of helping students below grade level to reach grade level often led her to think about quitting. She described feeling frustrated about the lack of support teachers receive when they have students

who are struggling. Charlotte felt that Black teachers are under such tremendous pressure from administrators to turn around struggling or failing students. Charlotte explained her frustration:

> You have to constantly work with students. Like for teacher wise you can't have a high percentage of failures 'cause then they look at the teacher and feel like you've done something wrong if you have a high percentage of failures. So, then they want you to do all this overtime tutoring and all this stuff to help the students that are failing. But then if they're failing and not coming to tutoring what then? And it's like they want you to work these miracles. So that's what I mean when they – like valuing the teacher. It's like everything's on the teacher. And it's like they don't put some of the responsibility on the student or their parents.

Kayla also did not believe she was set up for success because of the large classroom sizes at her school, where her students were not always working at grade level. Mary Jane went further into the complexity of preparing academic lessons in science. She explained that she had to do lesson plans for labs, lab lectures, and lessons for the core content in science classes. This commitment is unique to science educators because they have to plan three lessons per period. The pressure to raise test scores when the science content is already cumbersome, compared to other disciplines, is just another burden pushing Black female teachers out of the science classroom.

Socially burdened. Many of these women were carrying invisible social burdens and responsibilities for which they did not receive acknowledgment. Mary Jane was so overwhelmed by the burdens she carried that she cried as she told me her story. Their stories reaffirmed the

theories about the Black teacher having the invisible burden of being the disciplinarian for all Black students, including the ones they did not teach (Rigza, 2016).

Charlotte noted that she felt that Black females were the ones carrying the burden for most of their Black students. This was because most Black students did not feel like anything would ever change with regard to their needs, so they never went to administrators for help. Charlotte believed there was a huge difference in opinion on disciplining Black children; and, because of that, Black female teachers usually carried the burden of disciplining Black students in a school. However, this work was not generally recognized when moving up the career ladder for leadership positions. Janet also felt that Black women with science degrees would prefer to get a job in a more comfortable environment. She further explained:

> The kids are already rude – nobody's going to put up with that, nobody's who's spent all this time in – you know, educated science – getting science degrees, that's hard work . . . Why should somebody who majored in chemistry, you know, deal with that where they could go get a job at Amgen? [You] don't want 40 people to a classroom [with] behavioral issues, while you're trying to – with chemicals and knives with – you know, nobody – nobody is going to be teaching science in any type of chaotic situation. . . . A lot of social dysfunction of – of our community spills into the classroom

Kayla reinforced that if a person has a degree in the sciences, they could get a job in a lab doing research and would not have to deal with teenage hormones. Victoria expressed discontent with putting in overtime to make sure students have hands-on labs and then experiencing disrespect from students, making her feel unappreciated. Every single participant in this study voiced frustration with the disrespect they experienced from students. Disrespect from teenagers

is hard for parents and educators to handle, but the problem is that Black female educators are singled out to be the disciplinarian for *all* the Black students on campus. The role of being the disciplinarian for all Black students is rarely praised and certainly not compensated for, thus contributing to Black teachers leaving the field faster than their White counterparts.

Feeling Undervalued

The most intriguing theme that arose in this study is that these Black educators constantly compared the science profession to the education profession. There was not a female educator in this study who did not voice that the pros of being a scientist outweighed the pros of staying in education and being an educator. These Black female secondary science educators all spoke of *feeling undervalued* in the education field, compared to how they would feel in the science field. Teyana, for example, noted that she could easily get far more prestige and pay from a post within the science field:

> I can go to med school. I can go back into a PhD; I can go into industry; I can go and get a master's real quick and go teach at a junior college level and not have to deal with the political stuff . . . I do not know of any other profession where you are nominated for an award and you then have to go do work . . . meaning if you're nominated for Teacher of the Year, you have to write all these essays, you have to answer all these questions so that you can then win Teacher of the Year. I don't need extra work.

Janet also felt that Black women with science degrees would prefer to get a job in a more comfortable environment, one where they would not have to worry about disciplining students who act out. Similarly, Kayla stated:

> I could get a job at a lab and make twice as much and not have to deal with this. So why?. . . It's really just like there's not enough money, there's too many kids, there's, you know, our technology sucks – the technology sucks at our school. But all those little things I can work around. . . . It's just emotionally very tough.

Charlotte voiced that teachers who have STEM skills are getting paid much less than if they were working in corporate America, and these low salaries are indicative that educators are not valued in this country. Charlotte even commented that if there were teaching jobs where the administration backed teachers and made them feel valued and fewer classroom management or discipline issues, she would continue teaching for the next 30 years. Janet conveyed sadness about the fact that the teaching profession is not viewed as valuable, and is not thought of as a prestigious or even a viable profession. The consensus from the women in this study was that science is a highly marketable field that pays more than most fields; science skills are highly valued in the 21th century, but in education, science educators are not valued. However, all of the participants had stayed in the field because they wanted to help shape young minds in the Black community. But they were not sure how long that would last.

Inspiration

The participants in this study repeatedly noted that Black female science educators provided inspiration for other Black females to join the field of education. As such, despite the burdens that overwhelmed these women and pushed them out of the education field, a common thread was that they were all inspired to join the field by other Black women. Janet recalled that Black women have been teachers in America since they were working on plantation. She detailed the history of the Black woman teacher in the following way:

> The Black woman was the first teacher, not just for Black men, but for men of other races too, especially little White boys too. The Black lady was teaching them, you know, everybody. So, I don't know, I just think women don't understand because if they did I believe that more Black women would at least [consider the profession] . . . So I just feel like that's the same thing, like, guiding people. It's really the same thing, like showing people ways to success; ways to better your life, ways to escape some of the things that you may feel are going on in your neighborhood . . . and I just feel like it's the same thing, like teaching.

Janet was inspired to join the field because of the history of Black women as teachers and the importance of education, which was instilled in her as child. Mary Jane was encouraged to become a teacher by her mom's Black female friend. Charlotte was also influenced by her best friend—a Black female history teacher who told her to try teaching as a profession. Victoria was motivated by a member of her church, a Black female principal, to enter the teaching profession and combine her passion for science with her love of education, so she could make a difference in a child's life. Teyana was inspired to enter the teaching profession by all of the women of color who were teachers in her immediate family. Mary Jane concluded in her narrative that the best way to support new Black female teachers in science and recruit new teachers was to have mentorship programs just for Black female teachers, where the issues that are important to them can be addressed.

Janet felt that female educators were leaving the teaching field because they did not understand or were not aware of "the prestige and the importance of what it means to be a Black educator." Therefore, an important strategy would be to have open and direct communication

with Black community members to create a "cultural shift where the Black female educators are hailed in a different light." Janet surmised that if school districts could provide mentorship opportunities and financial incentives to young Black women who work in or who are studying in the science field, some of them might decide to go into teaching, instead of pursuing another path, such as medical school. Jackson (2017) echoed this sentiment when she stated:

> Therefore it becomes the responsibility of local school districts, which are on the frontlines of minority teacher shortages, to lead the way in finding pioneering strategies to build a teaching workforce that is more reflective of America and its diverse learners. (p. 39)

Kayla believed that making science more accessible to Black females *before* college would make a huge difference in inspiring Black females to become secondary science educators. All of the women agreed that recruiting Black female scientists before they graduated from college was a way to increase the number of Black females who became secondary science educators. However, there was not a consensus with the participants on the exact time frame before college that Black females should be recruited. Is it as early as elementary school or should we recruit science majors who are not sure of what they are going to do after college?

Length in the Classroom

The qualitative data from this study showed that the longer these Black scientists taught in the classroom the more they could reflect and speak about their experiences. Freire (1996) stated that to name the world, you must change it and come to terms with its complexity. The first part in combatting oppression is being reflective about the unjust and oppressive actions that impact you. Janet, who had the most experience, explicitly named the root of the problems with

recruitment and retention of Black female science educators and traced it back to the marginalization of Black females in slavery.

A less experienced teacher, Charlotte felt that Black females were the ones carrying the burden for most of their Black students but could not explicitly name why she thought it occurred. Victoria, the newest teacher, mentioned curriculum has a contributing factor to the reason why most black females do not see themselves as scientists. Additionally, Mary Jane believed that advocacy for our students to truly experience the curriculum is the root of the problem because she believed teachers just have to make things happen. For example, she believed that specifically White teachers did not always do the curriculum service because they did not think they believed the students could achieve.

This finding suggests that as a teacher matures with her experience in the classroom, the more she can speak about her experience and name the world for herself. This finding might correlate to Ingersoll's (2001) prediction that the problem is not recruitment but retention. As these Black females mature and reflect on their experience they are often not happy with experiences and leave.

Significance of Findings

The narratives indicate that the Black female science educators in this study are all carrying an invisible burden of supporting the Black community—financially, academically, emotionally, disciplinarily—which motivated them to disrupt the assumed pathway into the STEM field. These Black women wanted to teach and be a role model to young Black girls so that those girls could, in turn, see themselves in science. These Black women went above and

beyond by supplying science supplies, dealing with disrespect from students, and serving as role models, mothers, friends, and teachers.

However, their passions, unfortunately also become burdens, which seems to contribute to retention issues. They felt "stuck" in the education world and not allowed to develop their own scientific knowledge. On top of that, they were receiving modest pay compared to what they could make in the science field, which told them they are not valued. These Black women were matriarchs in their families and with that role also came financial responsibility, which teacher pay cannot support, but a science industry salary could.

Black female science educators share unique perspectives on their workplace environment. Decolonizing perspectives and Black feminist thought view Black women as having authority over their own lived experiences and knowledge of their own oppression, in ways that counter Eurocentric ideologies of racism, class, and gender (Collins, 2000; Darder, 2014). Black female science educators are connected to the Black community, and even though they could make more money in the industry and deal with less bureaucracy and student discipline, making a difference for a Black child supersedes other concerns.

These appraisals are useful for understanding how and why female teachers of color remain professionally committed to teaching. To create a political shift in theory, we need an emancipatory recruitment process that accounts for their lived experiences, so they can empower themselves and re-name the world in which they are expected to work and teach successfully (Darder, 2014).

One of the issues at the center of a decolonizing perspective is that every lived experience must be understood as tainted by politics of colonialism. Black women live in a constant struggle

of double jeopardy (Crenshaw, 1989; King, 1988). They have been educators in America since they were slaves on plantations and have constantly shaped young minds, White and Black. However, colonialism is rooted in racism, sexism, and classism, so the system fails to acknowledge the status of Black women as world-class educators. The internal battle encountered by many of these educators is centered on the following question. How do we do what we love and what we know will make a difference in the STEM pathway, but still support our students, families, and ourselves—financially and emotionally—in this socially, politically, and materially unequal society?

Implications

How can policymakers better address the fact that Black female educators are leaving the profession at significantly higher rates than their White counterparts? With the student body in America soon approaching a minority majority and the teacher workforce made up of over 80% White females, how are policymakers going to serve the needs of such a heterogeneous population? If there are no Black female secondary science educators, how can we expect young Black girls to see themselves in science? If Black girls cannot see themselves in science, how can we expect them to enter the science field and contribute to the diversification of scientific knowledge?

The challenges that Black female secondary science educators encounter are unique because they are in two fields that have been historically racist, gendered, and classist. It is only by listening to and engaging with their voices that policy makers and local school districts can make changes that will create an environment conducive to their needs. Black female secondary science educators are currently missing in action from the workplace and from academic

research. The implications of this missing-in-action phenomenon can have the serious consequence of widening the achievement gap for Black students in STEM. Consequently, this creates an even more monolithic STEM field that only addresses the needs of the elite.

There need to be initiatives and changes to the recruitment and retention process that take into account the experiences of Black female secondary science educators. These initiatives must address the political and historical contexts of Black women and account for the damage that has been created by past wrongdoings to the Black community. School districts, White teachers, and policymakers must be willing to listen to the experiences of Black female secondary science educators to better understand the burdens they constantly face in the K–12 education system. These voices can help shape educational practice and policy, which can diversify the teaching workforce, create a space where students can learn from teachers with different perspectives, and help contribute to a STEM pipeline where Black girls can see themselves in science and Black female science teachers are not missing in action.

Recommendations for Practice and Policy

Currently, there is very limited information about the recruitment and retention practices of Black female secondary science educators. The experiences of the participants in this study are just a glimpse into the "missing-in-action" phenomenon of Black female secondary science educators. Their voices can also help to provide us some recommendations for what is needed to create an emancipatory recruitment and retention process for Black female science educators. The following provides a summary of points derived from the study related to recommendations for educational practice and policy tied the recruitment and retention of Black female secondary science teachers.

Black female secondary science educators cited invisible burdens, poor pay, an environment not conducive to pursuing their own goals outside of education, and lack of industry supplies as the major reasons why they were thinking about leaving the field. However, these Black female secondary science teachers also had a common motivation for entering into and staying in the field—giving Black girls access to STEM and the love for the Black community. Most of the Black women were referred to this field by another woman of color, and all of the Black women had a love for the Black community that motivated them to continue working to ensure Black students had access to STEM.

With this in mind, policymakers need to push for pay increases for Black female secondary science educators comparable to the pay they would receive in the STEM industry. For Black female secondary science educators to be retained, they need opportunities within education to have a voice and an environment where they can learn about current STEM research. This is not the same thing as professional development that centers on helping students learn how to access STEM. School districts should work alongside Black female science teachers to engage in practices that facilitate their professional growth.

Policy makers must rethink teacher preparation to change how teachers are perceived. The women in this study were both scientists and teachers. Often times, these women saw themselves as scientist first. To begin to transform the valuing of K–12 teachers, we need to allow the female Black scientists to contribute to the significance of the scientific world. There seems to be a societal myth that, once one becomes a teacher, they are not an expert in their studied field. A rethinking of teacher preparation must occur to recruit and retain Black science educators.

Science classrooms need to be equipped with science supplies comparable to the industry, so that students can develop a passion for science within a serious environment where they can learn to hypothesize and design their own experiments. The teachers in this study argued that they could not conduct true science experiments if they are not given the supplies that scientists have in the modern world. Because they are seen as solely educators and not as scientists, Black secondary science educators do not feel valued in the education field. There is a need for policymakers to restructure the science classroom and the science pedagogy and curriculum to better support learning for the 21st-century student—and this must be done with the voices of Black female science teachers at the center.

There was a consensus among the participants that just a few decades ago, becoming a Black teacher came with prestige and respect. However, that is not the case anymore. These Black female secondary science educators did not feel valued because they were constantly told what to do and given responsibilities for which they were neither praised nor compensated. The science field is considered elite, but when the Black scientist enters the education field, that respect is lost and many opportunities to develop their work as scientists are marginalized. This points to the need for policy initiatives that allow classroom teachers to link their teaching and work as educators to scientific industry efforts out in the world.

To increase the number of Black females entering the science education field, policymakers and local school districts have to prioritize pay, as mentioned above. The Black women who participated in this study stated that school districts should recruit from the local community because the local community is invested in their own well-being and they are on the frontlines of the minority teacher shortage. Habermen (1989) also posited that it is the

responsibility of local school districts to pioneer strategies to build a teaching workforce that is more reflective of the U.S. population and its diverse learners because local school districts face bureaucracy, ambiguous role expectations, and deficient school resources.

One of the most successful efforts that enlists from the local district is Teach Tomorrow in Oakland (TTO), a teacher recruitment and development program that aims to place teachers from the local community into the classroom to truly reflect the diversity of the students (U.S. Department of Education, 2016). This program is a grassroots movement to diversify the Oakland Unified School District (OUSD) teaching workforce. "The program recruits OUSD alumni, community members, middle and high school students, paraprofessionals, out-of-industry professionals, and student teachers who value education, growth, and educating Oakland youth" (U.S. Department of Education, 2016). This type of recruitment program is grounded in the community and creates a pathway for community educators to serve as role models for students.

The participants also recommended university loan forgiveness and scholarship programs as a way to recruit and retain Black female science educators. According to Podolsky and Kini (2016), scholarships and loan forgiveness can be an effective tool for recruiting and retaining teachers to high-need positions if they are well designed. They also believe loan forgiveness and scholarships are well designed when the incentive covers tuition costs and living expenses.

The University of Maryland, Baltimore County (UMBC) started the Sherman STEM Teacher Scholars Program to address the shortage of highly qualified STEM teachers serving in high-needs schools. The program has a three-pronged mission to: (a) support UMBC's students and alumni who are preservice and in-service teachers in the STEM fields, (b) increase the

number of those who teach in high-needs and urban schools and school systems, and (c) increase retention of Sherman Program alumni in those schools and school systems. The Sherman Program actively recruits students throughout its undergraduate experience and provides professional development for both UMBC students and alumni who are currently teaching in school districts across Maryland and other states. In particular, its professional development is focused on developing culturally competent students (UMBC, 2018).

Participants listed access to industry supplies as both a recruitment and retention strategy for Black female secondary science educators. Currently, there is program called Amgen Biotech Experience, which provides an innovative science education program, allowing teachers to bring biotechnology into their classroom by providing research-grade equipment to secondary schools. However, it is solely limited to biotechnology and does not provide lab equipment that can stay in the classroom, such as hoods, incubators, refrigerators, which are specifically what the Black female science teachers in this study requested. Further research should be done on how to create partnerships with science companies to provide science supplies for classrooms or allow facilitation of equipment at industry science labs.

Participants shared that having culturally relevant science textbooks with pictures of Black females working in science would allow Black girls to see themselves as scientists. Currently, there are no published science textbooks that take into account the history and cultural relevance of minorities in STEM. Policymakers should work alongside textbook publishers to create STEM textbooks that represent all of the diverse learners in the classroom and honor the voices and inventions of Black female scientists in STEM that are often overlooked.

The women in this study saw themselves as role models and knew that Black women are the pillars in the Black community. Janet believed that if Black women could only see the value in being a Black teacher and take into account the history of the Black female, more Black women would join the field. These Black women science educators knew that STEM is not typically accessible to Black girls and wanted to increase the number of Black girls who go into the field. Janet suggested a way to increase the number of Black women entering science education by providing resources and platforms where Black female science teachers' experiences could be heard and engaged as part of an innovative mentorship approach. She brought up ideas for hosting "forums, seminars, and workshops," and she thought that connecting with local politicians, including mayors, could also highlight the significance of teaching to the community. Moreover, further efforts must be carried out to make the field of STEM education accessible to Black girls through initiatives that could create and expand the science education pipeline in a systematic way.

Future Research

Currently, the research on the recruitment and retention processes for Black female secondary science educators is nonexistent. The narratives in this study have provided some preliminary evidence that there is a need for more studies to be conducted with Black females who are scientists and who decide to enter the teaching profession. These women have unique experiences because they often transition from a difficult STEM climate only to enter a hostile educational climate, one that subjects them to micro and macro aggressions (Kokki, 2016). Moreover, I argue that, to create an emancipatory recruitment and retention process, we must hear and engage the voices of those often not at the table, Black female secondary science

educators. This study has provided a mere glimpse into the experiences of six Black female secondary educators and how they viewed themselves in the field of education. This study should be used to build on more expansive research for creating an emancipatory recruitment and retention culture within schools and universities.

Epilogue

Tomorrow,

I' ll be at the table

When company comes.

Nobody' ll dare

Say to me,

" *Eat in the kitchen,*"

Then.

--Hughes, Collier, & Linn, 2012

As I write this reflection, it is bittersweet. Writing this dissertation has been a journey along which I have reflected on the pains and the strengths I carry from being a Black woman in STEM education. At this time, I have to move onto a new journey, where the colleagues who have informed this research will no longer be with me, in-person, every step of the way, combatting and having authentic dialogues about the oppression we see in our classrooms and schools. I remember when I first entered my program, I met a dynamic woman who challenged me and allowed a Black girl from the hood of the Southside of Chicago to feel heard and seen in the world of academia. This magnetic woman, Dr. Antonia Darder, showed me that capitalism

and racism are inherently linked. She told me that I have a story worth hearing, but to be aware that it is shaped by the history, culture, and politics of America.

As I reflected on the injustices I had encountered and seen in the science classroom, I knew that I wanted other Black women who love science and have passion for teaching to feel included. I did not want them to leave the science classroom due to the frustration of unrealistic expectations that they be the all-encompassing Black woman, stripped of power and voice in the field of education. I met with my chair and knew I had to use a decolonizing methodology because it would "engage with issues related to the lives and survival of those deemed as other" (Darder, 2015, p. 69). I wanted a seat at the table of academia, and the myth of colonization said that if I played by "their rules," I would finally be able to have a seat. And yet, a decolonizing perspective reminds me that I do not have to play by "their" rules; I can define my own rules, given my knowledge, history, and experiences.

With Black female secondary science educators at the center of my study, I have learned that these Black women are resilient and carry burdens from both outside and inside the classroom. These women are compelled to teach little Black girls science because they know that if they do not, others will not necessarily want to, and even if they did, it would not be with the same intrinsic motivation that drives Black teachers to never accept less than the best from our children. The biggest outlier that I learned from my study is that all these women had dreams beyond being a classroom teacher, and they felt like those dreams were not being nurtured or appreciated. These science teachers wanted opportunities to develop their own businesses, conduct scientific research, and so much more. They wanted freedom, better pay, respect, and the prestige that the science field offers, unlike the education field.

These Black women sacrificed their own passions and freedom to help the Black community move forward in STEM, but at what expense to their own happiness? When the Black female secondary science educators cite pay as an important factor in deciding whether to enter or stay in the teaching field, it is centered in historical, cultural and economic oppression. I left the science classroom to become an administrator because of pay and freedom. When I think of why I wanted more pay, it was not to buy a better car, house, or anything of that sort; it was to have more money to support my family and myself. I did not realize the historical and cultural implications at play. Black women's trajectory has been shaped by slavery, civil rights, and the high incarceration rates of Black men, and this all has an effect on what jobs we are willing to take to support our families and communities.

This study impacts my own practice as an administrator because it allows me to hear the voices on the fringes and take into account their narratives when I am hiring and trying to retain Black female teachers, who are leaving at significantly higher rates than others. As a Black female science educator, I want to help disrupt the status quo pipeline of those entering the STEM fields, by creating conditions where Black girls can see themselves as scientists and earn degrees in STEM. One way to create these conditions is to hire Black female science educators and listen to their needs and desires to disrupt the hegemonic practices that currently exist. This study provides a brief glimpse into why these Black female secondary science educators are "missing in action," but most importantly, it brings us one step closer to providing Black female science educators a seat at the table.

Appendix A
Profile Questionnaire

Personal Data Form This information will be used only for the research study entitled: *Missing in Action: A Critical Study of the Absence of Black Female Science Teachers*.

Personal Information	
Full name:	
Nickname:	
Phone:	
Email Address:	
Birthday:	
Undergraduate Institution/Dates attended:	
Degree earned/Field of study:	
Graduate Institution / Dates attended:	
Degree earned / Field of Study:	
Did you pursue postdoctoral work?	
How long have you been teaching?	
What credential (s) do you possess?	
Did you have a career before teaching? If so, what was it?	

Appendix B
Narrative Prompts

1. Can you tell me a little about your personal life story?
   PROMPTS: Where did you grow up? What age did you come to the U.S.?, How long have you been teaching? What subject and level are you credentialed in? What do you teach? Where did you go to school?

2. Can you tell me how you became an educator?
   PROMPTS: Were you influenced by anyone? Were you recruited? Any specific recruitment process that you brought you into the field? Any role models?

3. Was it always science?

4. **PROMPT: How long have you been a teacher?** What has kept you in the field?

5. Have you ever thought about dropping out the profession? How so? **PROMPT**: What were some of the experiences or reasons that made you consider leaving?

6. I'm concerned about the data that suggest that we are not staying in the profession? Why do you think Black secondary teachers are not staying in the profession? **PROMPT:** Why do you think there aren't more of us out there?

7.! What should be done to keep us in the science education field? **Why have you stayed in the field of teaching?**

8. I'm really interested in trying to understand what it's like for the next future of teachers. What can we do to recruit more Black females to the science education field?

9. Systemically, what can policy makers or administrators can do to increase and retain Black female secondary science teachers?

10. Do you have any other thoughts or reflections about the conditions that you believe support teacher retention and recruitment? Do you have any questions for me? (Here are the next steps. I will explain member checking and timeline)

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