Effective Teachers: Culturally Relevant Teaching From the Voices of Afro-Caribbean Immigrant Females in STEM

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Abstract
This article focuses on the educational strategies that can be used to support female students of African descent in their persistence in science, technology, engineering, and mathematics (STEM) education and careers. STEM careers have historically been White male and White female dominated, which has yielded an underrepresentation of those of African descent. Drawing from a grounded qualitative case study, the data used for this article share the responses of Afro-Caribbean females in STEM who have immigrated to the United States from the country of Panama. As Latinas, they are representative of the changing face in the American educational system—bilingual, multicultural, and of African descent. The strategies offered reflect their own teaching practices, their former teachers, or experiences with their children’s teachers. What emerged were descriptions of four strategies and behaviors of effective teachers that align with Ladson-Billings’s culturally relevant pedagogy and Gay’s culturally responsive teaching. Included in the findings are the high standards and expectations embodied by effective teachers that serve to positively inspire their students. Culturally responsive teachers create an atmosphere of learning that supports academic success, conveying their belief in their students’ ability based upon their own reflectivity. As the U.S. educational system continues to become multilingual and multicultural, there is need for strategies for the successful inclusion and progression of students in STEM educational pathways and careers. This will occur as teachers challenge themselves to be the agents of change in the lives of their students.

Keywords
culturally relevant pedagogy (CultRP), culturally responsive teaching (CultRT), STEM, gender

The effect on curriculum development to meet the requirements of the No Child Left Behind (NCLB) Act has meant that students reached high school from schools where the emphasis was on increasing reading and math scores to the negation of science literacy. This program, which was designed to increase the performance of all students and close the achievement gap between Whites, Blacks, and Hispanics, has created a new problem (Freidich, 2003). Results from the National Assessment of Educational Progress (NAEP; National Center for Education Statistics, 2009) show that only 21% of Grade 12 high school students tested at or above proficiency in science. Denying these students access to scientific literacy in their formative years rendered them unprepared for the rigor of secondary education training in science, technology, engineering and mathematics (STEM).

The public education in the United States has seen notable changes in the racial and ethnic composition of schools. The National Center for Education Statistics has indicated that minorities—Latinos, African Americans, and Asians—are now the collective majority representing 50.3% of public school students (Maxwell, 2014). Non-White student enrollment has already reached majority levels in major school districts in the South and West regions of the country (Maxwell, 2014). In California, 73% of public school students are non-White (Boser, 2014). Within these multicultural and multiethnic classrooms, the new immigrant students are often also multilingual with English not being the home language. Furthermore, Hispanic or Latino students are not considered a racial group because within its members are those of African, European, or Indian descent (Genova & Ramos-Zayas, 2003; Quiros & Dawson, 2013; Tatum 1997).

The educational system is not preparing an adequate number of students in STEM resulting in the need to recruit...
individuals from India and China for many of these specialized occupations (National Academy of Sciences [NAS], 2011; Saxenian, 1999). The National Science Foundation, Division of Science Resources Statistics (NSF; 2013) finds that although gender continues to be an issue for STEM membership, racial classification continues to be a major marker for STEM inclusion. The findings revealed that in 2010, Whites represented 69% of all STEM jobs although they represented 63.6% of the population, Asians held 18% in STEM jobs although they were 5% of the population (for this reason they, are not classified as underrepresented in STEM), and Blacks were 12% of the population, but only 5% of STEM members.

Females in general, but females of African descent in particular, are underrepresented in STEM (Hill, Corbett, & Rose, 2010). This could be a by-product of the racialized beliefs regarding intelligence and STEM inclusion for those of African descent (Chen, 2011; Quinn & Spencer, 2001; Steele & Aronson, 1995). As a result, the onus is on teachers to reconsider the ways in which they foster and support students in STEM education, and how they may be denying access to underrepresented groups—students of African descent in particular.

This article’s argument is twofold. First, effective teaching strategies are “good teaching” that can empower students toward academic excellence. Second, these teaching strategies yield greater persistence in STEM educational training. The question under consideration is what are the pedagogical ideologies and strategies offered by CultRP and CultRT that are effective teaching strategies to support females of African descent in STEM educational pathways that lead to STEM careers? Using the voices of Afro-Caribbean females in STEM careers, this article offers insights from their experiences with educators, as educators, or as parents or grandparents. These women were credible voices because they not only participated in STEM but also rose to leadership and management positions in their respective fields. Therefore, they were able to offer a reflective perspective based upon their own experiences and challenges as women of African descent in STEM.

Explanation of Key Concepts

Taken from the broad definition of the National Science Foundation, STEM will refer to all careers in biological, physical science, natural sciences, engineering technologies, and computer science; it will also include the social sciences and psychology (Green, 2007).

Throughout this article, culturally relevant pedagogy will be denoted as CultRP and culturally responsive teaching as CultRT.

The term Black as a racial construct is often rooted with negative perceptions originating from fallacious beliefs used to propagate hegemony. Racial constructs attempt to create social structures that provide privilege and advantage for those who possess comparatively light skin (Burton, Bonilla-Silva, Ray, Buckelew, & Freeman, 2010; Machery & Faucher, 2005). This article relies on ethnic and cultural markers that include language, beliefs, and historical events. It recognizes that within people of similar phenotype (i.e., physical characteristics based upon genetics and environment), there are cultural and ethnic differences. For example, African American, Afro-Caribbean, and Afro-Latinas may be racialized as Black based upon phenotype, but they represent diverse cultures and ethnic traditions. In acknowledging this, the article concedes that hegemony affects all persons of African phenotype. Therefore, the terms Black and African descent will be used interchangeably as a collective reference to all people of African ancestry inclusive of Africans and the aforementioned groups that comprise the African diaspora, and will refer specifically to cultural and ethnic groups when needed.

Furthermore, this article attempts to define the effective teacher beyond the characteristics of those who utilize good teaching habits. Drawing from Stronge (2002), this article will define an effective teacher as an agent of change who integrates teaching strategies that reflect behaviors and beliefs that yield positive student learning outcomes. Effective teachers create a culturally relevant learning environment where students make academic progress regardless of their prior levels of achievements and deficits (Ladson-Billings, 1994).

Conceptual Framework

CultRP

CultRP was introduced by Gloria Ladson-Billings (1994) to combat the “intellectual death” occurring among African American students in the United States. Its “aim is to assist in the development of a ‘relevant Black personality’ that allows African American students to choose academic excellence yet still identity with African and African American culture” (Ladson-Billings, 1994, p. 17).

CultRP is designed to “empower students intellectually, socially, emotionally and politically by using cultural referents to impart knowledge, skills and attitudes” (Ladson-Billings, 1994, pp. 17-18). This is done through the integration of home and community experiences with school, curriculum, and classroom. Students from the homes and communities of the dominant culture do not experience the lack of integration from home and school that is often found in students who are from underrepresented groups.

Looking specifically at African American students and their teachers, Ladson-Billings (1995a) found three areas that CultRP relies on: “(a) students must experience academic success, (b) students must develop and maintain cultural competence, and (c) students must develop a critical consciousness” (p. 2). CultRP (Ladson-Billings, 1994) offers effective strategies for the academic success of African
American students who were formerly marginalized by the educational system (Coleman, 1988; Wilson, 1987). She refers to these strategies as simply good teaching for any student regardless of race or ethnicity.

Ladson-Billings (1994) proposed the following CultRP teaching ideologies that CultRP teachers embrace to insure success in African American students.

**Shared responsibility for student excellence.** CultRP teachers believe that students are capable of excellence and share the responsibility with students, parents, and community to see it realized.

**CultRP teachers see teaching as an art and not a technical skill.** Teachers are proud to be teachers.

**CultRP teachers believe all students can succeed.** This is not negotiable. Academic progress in some form is expected from all students in their charge.

**CultRP teachers help students make connection to community, nation, and global community.** Teachers are aware that there may be other cultures represented in their classrooms; they teach in ways that foster respect for other cultures.

**CultRP teachers see knowledge as mining not pouring.** They realize that their students are not blank slates waiting for them to pour knowledge into, but rather they bring a fund of knowledge from their homes and community.

**CultRP teachers are passionate about knowledge and knowledge production.** Teachers challenge themselves academically and realize that learning is a lifelong process.

**CultRP teachers provide intellectual challenges.** They realize that education needs to extend student thinking, so there is no need to give all the answers; they help students to find it for themselves. Through this, they also reflect that their self-esteem is not connected to being perceived as the sole source of knowledge; they do not need to be the center or the one with all the answers.

**CultRT**

CultRT (Gay, 2000) emerged as a by-product of cultural relevant pedagogy. It moved beyond pedagogy for African American students and extended to include all students who are from racially and ethnically diverse backgrounds inclusive of Native Americans, Asians, and Immigrant Blacks. This supported the premise of Ladson-Billings that CultRP was simply “good teaching” for all students. Gay asserts that culture matters and the cultural identity of students cannot be denied if they are to be educated. Students’ prior cultural knowledge and references must be affirmed, validated, and then woven into the academic experience (Gay, 2000).

One characteristic that emerged from CultRT is the concept of care (Noddings, 1984, 1999). Caring is action provoking and requires effort from the teacher. Therefore, she alludes to the notion of culturally responsive caring (Gay, 2000; Parsons, 2005). Teachers are further challenged to learn strategies to create classrooms where learning styles are respected through the use of differentiated instruction and classroom activities (Gay, 2000).

CultRT is used in diverse classrooms and school districts throughout the world. It has been adopted to help the academic progress of Maori students in New Zealand (Savage et al., 2011) and Canadian school districts with ethnically diverse students (Ontario Schools, 2013).

CultRP and CultRT require constant and critical reflection and praxis by the teacher. To create classrooms where students are successful, CultRP and CultRT teachers consider the epistemic root of knowledge production from a critical lens to be aware of the ways in which education has served to empower students who are White while marginalizing those from different ethnicities and cultures.

African American students in particular and non-White students in general are often taught by teachers who view the world from a dominant culture perspective and ignore the lens from which others may see the world and their place in it (Gay, 2000). CultRP and CultRT necessitate a reflective praxis that includes a type of care that challenges teachers to consider their hegemonic position and privilege and the ways in which it affects student academic performance. The onus is on teachers to resist the temptation to use the excuses that blame family of origin, socioeconomic factors, or academic readiness for the lack of student performance.

### Education for Students of African Descent

King Miller (2013) offered research on the academic success and progress of African American students that resulted in the following: (a) African American students need to feel valued and have their ethnicity and culture validated (Harris & Marsh, 2010; Ladson-Billings, 1995a; Lynn, Bacon, Totten, Bridges, & Jennings, 2010), (b) teachers need to have high expectations for student success (Cholewa, Amatea, West-Olatunji, & Wright, 2012; Lynn et al., 2010; Tucker, Dixon, & Griddine, 2010; Wiggan, 2007), and (c) African American students need to experience connections with their teachers, their classrooms, and their school (Lemberger & Clemens, 2012; Li & Hasan, 2010; Wiggan, 2007).

Historically, females in general were excluded from subjects such as math and science as these disciplines were deemed for males only (Gornick, 1990). When looking specifically at females of African descent in STEM educational pathways, the educational outcomes are even more challenging (Bonous-Hammarth 2000; Hill et al., 2010; Jenkins, Harburg, Weissberg, & Donnelly, 2004). With the precept that math and science are subjects for those who are intelligent and
that Blacks are surmised intellectually inferior to Whites, the attrition rate increases for Blacks. Ultimately, for Black females there seems to be a double bind that limits their access to STEM educational pathways—race and gender (Malcom, Hall, & Brown, 2005).

Furthermore, LaVar, Phillips, Jackson, Berhanu, and Amechi (2014) found that persistence for Black women in computer science higher education courses was made difficult by the perception of some professors who believed that they had only gained access to the program because gatekeepers felt “bad about slavery.” Borum and Walker (2012) shared the experiences of Black female PhD holders who cited their persistence in spite of overt statements that reflected that women in general, but Black women in particular, were not equipped to do mathematics. Further feelings of isolation and lack of support were reported as some of the difficulties they experienced in earning a PhD in mathematics.

In 2005, 40% of all full-time faculty in colleges and universities in the United States were women (McNeely & Vlaicu, 2010). However, they are still less likely to be in tenure track positions when compared with males; women tenured at universities were 44%, whereas males tenured were 62.0% (Catalyst, 2012). Of the 7,000 computer science doctoral faculty in 2006, only 60 were reported as African American women. Also, less than 1% of the 17,150 post-secondary teachers in engineering were African American women. African American women appeared to fare only slightly better in the biological sciences holding 380 of 25,000 faculty positions (Hill et al., 2010). There remains exclusion among women of African descent in STEM careers.

Unfortunately, the data do not portray an adequate picture because all persons of African descent are categorized as Black or African American. Afro-Caribbean immigrants are the largest Black ethnic population in the United States, comprising 9% of the overall immigrant population (McCabe, 2011). Furthermore, there are those who may self-identify as Latina/Afro-Latina. About 8% of Black immigrants are from Spanish-speaking countries, including the Dominican Republic, Mexico, Panama, and Cuba. With regard to Panama, one third of those who immigrated to the United States in 2005 self-identified as Black (Kent, 2007). This article will present evidence from these Black/Afro-Latina/Afro-Caribbean females in STEM attesting to their perceptions of positive effective teaching strategies that may embolden females of African descent to persist in STEM educational training and into STEM career pathways.

Method

This research study used a qualitative case study approach. Qualitative designs are inductive. Knowledge is constructed from multiple observations after which a conclusion is drawn (Marshall & Rossman, 1989). Qualitative researchers attempt to use thick description to express as fully as possible the varied and nuanced meanings related to the events or observations they are attempting to explain (Geertz, 1973).

In case study research, the issue is explored through one or more cases within a bounded system (Creswell, 2007). A case study is an examination of a particular group, entity, or case within a system to understand their response to a particular event or their behaviors within a particular system (Merriam, 1988). The data sources for a case study may include observations, interviews, or reports and documents (Creswell, 2007).

The selected methodological approach is the most beneficial to explore the lived experiences of the women in this study and garner reflections from their past. From strategies they used with their students and the strategies they observe as beneficial to their children/grandchildren, they offer insights to educators. The selected case study approach affords the opportunity to focus on this small group, to thickly describe their responses to fully understand the needed support of females in their pursuit of STEM education and careers.

Participants

Five Afro-Caribbean women from Panama were selected for the study. Panamanian women were selected because of the historical relationship in providing STEM workers to the United States and Canada (Clarke & Riviere, 1989). New York City was selected because it is a major city of entry for all immigrants in general and Afro-Caribbeans in particular (Advincula, 2007). It is one of the cities with the largest Afro-Caribbean populations (McCabe, 2011). Participants were recruited from members in the Afro-Caribbean community through the church, school, and neighborhood hospital. A purposive sample (Bogdan & Biklen, 2007; Creswell, 2007; Lincoln & Guba, 1985) was determined to best meet the needs of this research. All participants were from a specific immigrant population representing a specific community in the United States with information and strategies to amass an understanding of the research question that would lead to a grounded theory design analysis (Lincoln & Guba, 1985). Three selection criteria for the purposive sample were used.

The first criterion was that the women had to be currently or previously employed in a STEM career. All of the women had gained success in their field and were often the first Black woman to enter their workplace or position. STEM careers were defined by the STEM Occupation Classification list by the National Science Foundation, which included science teachers, nurses, and psychologists (Green, 2007; Landivar, 2013). The second criterion for selection was the participants had to verify that their parents or grandparents had voluntarily immigrated to Panama from various Caribbean islands to work on the Panama Canal building project with the American government.
Each of the study participants voluntarily immigrated to the United States from Panama between 1965 and 1975. All participants were bilingual, speaking both English and Spanish, and were born in the Central American country of Panama. During their time in Panama they lived either in Colon, the port of entry from the Caribbean islands or in Panama City. Participants selected their own pseudonyms for the study, which will be used throughout this article.

**Data Sources**

There were four data sources selected for this research. Data sources included interviews, a demographic survey, researcher field notes and observations, and artifacts and documents. An explanation of these will follow.

**Interviews.** In qualitative research, knowledge is produced through social interactions (Kvale & Brinkmann, 2009). In this process, an interview is an "an interchange of views between two persons conversing about a common theme" (Kvale, 1996, p. 44). Interviews were conducted individually in a location agreed upon by the researcher and participant. The interviews were at their homes, restaurants, or their workplaces. There were more than 50 open-ended interview and probing questions used throughout the individual interviews. The interviews lasted 5 to 8 hrs over 3 days. Questions were divided into three foci. This article addresses the third foci which is the support needed from teachers to enable females of African descent to persist through STEM educational pathways.

**Demographic survey.** The survey was emailed to those participants who were presently employed; it was given in person to those who were retired and were traveling between the United States and Panama at the time of the inquiry. The protocol for writing this survey was taken from several sources. I drew upon LeCompte and Preissle’s (1993) description of a confirmation survey which uses structured questions to gather key information. The questions were closed and quantifiable (Marshall & Rossman, 1989). The survey also included nominal questions about age, school attendance, and college major and degree (LeCompte & Preissle, 1993).

**Field notes and observations.** I used an ethnographic approach to field notes data, which included jottings, headnotes, and memos (Emerson, Fretz & Shaw, 1995; Mason, 1996; Schatzman & Strauss, 1973). I used two forms of field notes: key word jottings and whole text jottings (LeCompte & Preissle, 1993). I typed memo journals after each interaction with each participant and included the date, the participant pseudonym as per the Institutional Review Board, and a brief overview of the interaction from my perspective as the researcher (Emerson et al., 1995; Schatzman & Strauss, 1973).

**Artifacts and documents.** Documents were derived from public sources. It included recognitions and awards attesting to the participants’ level of work-related success. Most of the participants gave me written information on themselves (i.e., pamphlets/materials they published for their work), or I used the Internet and found public information about them. One participant had been honored at a large regional area awards dinner. This event was attended by notable members in her field as well as local politicians.

**Data Analysis**

Data were triangulated using open-ended interview questions, field notes and observations, the qualitative survey, and documents (Emerson et al., 1995; Kvale & Brinkmann, 2009; LeCompte & Preissle, 1993; Patton, 1980; Schatzman & Strauss, 1973). All interviews were personally transcribed and coded by the researcher (Lincoln & Guba, 1985; Schatzman & Strauss, 1973; Strauss & Corbin, 1990). The preferred language of the participants was respected, and translations are provided where necessary (Myers-Scotton, 2006).

The study used a grounded theory approach and the procedures and protocol for such a design (Strauss & Corbin, 1990). In grounded theory, knowledge is derived inductively, moving from the particular to the general. It is derived from the data as it pertains to the cases (Strauss & Corbin, 1990). Procedures and protocols for grounded theory came from Strauss and Corbin (1990), which included the coding strategies of open coding, axial, and selective coding. Data analysis began from the time of initial collection or interviews, and categories were developed from constant comparisons derived from the theoretical memos written by the researcher. Constant comparisons included comparing incidents, stories, and descriptions that were similar for all participants (Lincoln & Guba, 1985). Furthermore, I contacted all participants for member checking to ensure that they were in agreement with my analyses (Glesne, 2006; Lincoln & Guba, 1985).

**Findings**

This article was extracted from more than 45 questions from two of the three main subquestions from the larger study. What emerged from the overall data was the significance of cultural identity on the persistence of these Afro-Caribbean women. The values and strategies learned from Caribbean culture seemed to have influenced their choices of STEM careers and their ability to persist in the face of adversity. When recalling educational challenges in the United States, they confirmed that racial inequities affected the education of Black children (Banks, 1997; Coleman, 1988; hooks, 1994; Lareau, 2011). In addition, they voiced their concerns regarding stereotype threats (J. Aronson, Fried, & Good, 2002; Steele & Aronson, 1995) which serve to exclude Blacks and females from participation in math and science. From their responses what manifested was an intersection between how they gained success themselves and what resources were needed to garner this success.
The focal point of this article is the resources for STEM success, specifically the need for effective teachers for Black females in STEM. This emerged from the analysis of the data following a grounded theory approach. Although they did not have the academic language to refer to CultRT and CultRP, what they voiced aligned with the tenets of these pedagogical theories.

This section begins with a description of the participants to establish credence for their offerings. The following describes their age of arrival at the United States and choice of STEM career.

**a. Nubia** is a part-time practicing nurse and professor in the nursing department at a Historically Black College (HBCU). She came to the United States at the age of 12 and entered and completed Grade 7. She completed the remainder of her education in New York City public schools. She then applied and attended City College to study as a nurse. She later received her master’s in adult clinical specialty.

**b. Afia** completed K-12 in Panama. She received a full scholarship for university in Panama and attended 1 year at the University of Panama before deciding she wanted to study psychology. As it was not offered at any university in Panama, she applied and was accepted at a college in New York City. At the age of 21, she arrived in New York City to pursue her degree in psychology. She would later also obtain a master’s degree in psychology and in social work.

**c. Andrea** gained admittance to the United States as a result of a nursing shortage. After graduating from nursing school in Panama, she worked for 2 years as a nurse. Salaries were very low and a friend in the United States suggested she apply to hospitals in the United States. She applied and was accepted to work at a large hospital in New York City. The hospital provided her with the visa, and eventually she was united with her husband and children in the United States. She came to the United States at the age of 26; within months of her arrival, she took the national board exams and qualified as a registered nurse in New York City. She pursued her master’s degree in public administration while working in her field. After completing that, she pursued the course for a new certificate being offered in quality control training.

**d. Fusia** is a podiatrist. She came to the United States at the age of 15 and entered Grade 9 and completed high school. She had wanted to be a doctor from the age of 9 when she accompanied her grandmother to a hospital in Panama and found that there were not enough doctors to attend to all the patients. After attending college in New York City, she was accepted into medical school for podiatry in New York City.

**e. Dorcas** came to the United States at the age of 23 with a degree in chemistry and biology from the University in Panama. She had taught for over 30 years. At her first school appointment, she was the first Black instructor to teach an academic subject (math, science, history). She was part of a team of teachers who developed a Spanish manual for biology students to help bilingual students in the New York City public schools be taught in their first language. Dorcas was a retired middle and high school biology and chemistry teacher.

From their perspectives as educators (Nubia, Dorcas, and Afia) or as parents (Andrea, Afia), they lend their voices in support of the culturally relevant instruction which they perceived affected their outcomes in education. The following is the result of their collective responses that resulted in the strategies and behaviors of effective teachers.

**A Belief That Every Student Is Capable of Learning**

The participants strongly shared the importance of positive, teacher communication that reflects faith in the students’ abilities. Dorcas began her teaching career at an inner-city middle school where most of the students were of African descent representing African Americans, Afro-Caribbeans, and Afro-Latinos/Latinas. However, most teachers were White and Jewish. She did not perceive that the White teachers believed in the students’ ability to learn and become successful professionals. Many felt that they would remain blue-collar laborers like their parents. Below is Dorcas’ response to what she felt was the difference among the White teachers toward the students:

Dorcas

I think it’s a class [thing] and they see the kids are poor . . . from poverty and also many of the White teachers especially they feel that those children will never fill their shoes . . . In my mind, I’ve never felt that way . . . I’ve always felt that one day one of these children will fill my shoes and fill it better than I . . . A lot of teachers don’t have that.

This powerful statement from Dorcas demonstrated her belief in her students and reinforced her expectation that they would do better than she. She seemed to suggest that when teachers do not believe in the ability of their students, they are directly limiting their students’ potential. She further added, “Don’t just look at the kids and give up . . . because in those brains they have a lot to offer.” Dorcas believed that her students possessed the ability to be successful, and it was her communicated expectation of this fact that enabled her to get them to produce.

Afia, a school social worker and college professor, adds that often teachers communicate low expectations for students of African descent because of the cultural and social beliefs:
Afia

I think the studies have shown that people don’t expect us to be smart and those are subjects that are considered to be smart subjects, [such as] math. I remember a Chinese Asian kid who was having a hard time and a teacher said to me—and they were packing the Black kids in Special Education—and she said, “Oh he can’t be learning disabled he’s Chinese.” This was a so called teacher, and she was saying this about this kid because he was of a particular group. So the assumption is that you know the expectation is that you can’t do it and you get that message.

The implications are that if Asians struggle academically, it is not because of their lack of ability but some other external factor. However, filling the special education classes with students of African descent was reasonably expected.

The problem with communicating to students that they are less capable is that it erodes the confidence needed to attempt new and challenging tasks and increases their fear of failure. To counter this, teachers are challenged to teach in ways that communicate care, provide the necessary conditions for learning, and transgress the boundaries of what was previously defined as good teaching (hooks, 1994).

When asked what would help them to persevere in STEM, all reported the need for self-confidence; family support and teachers who help imbue self-confidence through sensitivity to culture, gender, and familial concerns. Andrea stated, “The first skill is to have personal/self-confidence, Believe in yourself and when challenges come, because they will . . . don’t ever turn it down because that might be the challenge that you will be successful at.” Dorcas had immutably high expectations for her students and employed a teaching style that was often light-hearted. This resulted in students who were engaged and active in their learning. She remembered that they would say about her: “You are going to Noriega’s class [the former military leader of Panama].” She was known for discipline and control.

Dorcas

Because I told them, once you cross into my class, hats off, and when I close my door . . . “Oh, oh there she goes . . . don’t make her angry because the accent is gone, she becomes Jamaican.”

Dorcas was firm with her students and used her culture and Creole English to communicate her expectations.

Nubia, a professor of nursing at a HBCU, shares her concerns about the effects on Black students when they constantly receive messages regarding their inability. When asked about her students and why she thought the ones who needed extra help did not seek it she reasoned:

Nubia

[Her students say] “I don’t want you to think I’m stupid.” I say, “Nobody knows everything. You are here to learn. Nobody is going to think you are stupid.” I get this over and over again. I have an open door policy. [She says to them] “If you don’t want to see me, you can email me, I’ll explain it by email, but you don’t even seek the help I give you.”

Nubia’s African American students were not willing to seek the help they needed based on the merits of the teacher–student relationship. This may have been the case because internally they had to fight against the covert and overt messages conveyed by previous teachers that they do not possess the capabilities to understand such content.

This communicated message regarding their intelligence from their foundational years may have served to sabotage their willingness to seek help when needed. This lack of academic equity often left students feeling it was best to struggle alone rather than expose such weaknesses (Beilock, 2010). This attack on their self-confidence must be countered by both the school and the home. This can be done by the teacher forming connections with the home environment and culture.

Be the Bridge Between Home and School

Parents are the first teachers that children will have. As such, they are concerned with the educational progress of their child, and many understand the importance of their role in the academic process (Lareau, 2011). It becomes a challenge if teachers feel there are no educational goals in the home and proceed to address parents of African descent as if they were simply happy to have their children socially accepted. Lareau (2011) found that middle-class African American parents had high expectations of their children, were more involved in the educational process, and monitored teacher performance closely. Unfortunately, what some parents came to realize was many teachers did not expect them to have academic goals for their children. In parent–teacher meetings, these teachers’ sole attention rests on the physical characteristics of the student or on their ability to socially conform in the classroom:

Andrea

When I go and hear about my kid in school, tell me about his grades and his academic performance. I don’t want to hear how handsome and what a delight, I had to stop that . . . I know how handsome or not he is, let’s talk about his grades.

When parents set academic goals for their children it is off putting when they encounter teachers who assume because they are Black they do not value education (Lynn et al., 2010). The communication to both student and parent is that there is no expectation of academic achievement because of their racial categorization (Massey, Scott, & Dornbusch, 1975).

When Nubia came from Panama she entered the seventh grade. She reflected on the fact that although she could speak the language and had great math skills, she struggled with the
academic English. She explained that her English teacher served as a cultural bridge for her academic success. After meeting with her parents, he had a conversation with her:

Nubia

And then my English teacher was a young, White guy, and he said, “Tell me something about yourself?” I said, “I’m new to this country and my dominant language is Spanish” [all of her education to this point was in Spanish] . . . He developed a different approach in terms of teaching me. I would meet with him every day after school for 30 minutes and I would work on English comprehension and he said to me all you need to do is just read . . . When classes ended in June he gave me a list of books that he wanted me to read over the summer . . . He said, “Because when you read them when you come back in September you will be ready.”

This teacher did not operate based on racialized social assumptions; instead, he took the time to ask her questions about her background and to learn about her home and culture. He gave the extra time after school and became the sponsor she needed to usher her into this new system. To be effective, teachers must come to learn and engage in the culture of the student with the parents, and overcome damaging myths about children’s aptitudes, to create successful academic strategies (Delpit, 1988). With the help of this instructor, she was ready to move on to eighth grade after just 5 months of instruction in the United States.

As a parent, Andrea’s interaction with the U.S. educational system reflected frustration. She felt that many White teachers had preconceived negative beliefs about Black students:

Andrea

And for some Black kids they become extremely intimidated or they become bad behaving because they feel if I’m going to be blamed anyway . . . I find that they give more attention to the Whites . . . I experienced that with my own kids and I went to the school and told the teacher pretty much what I thought.

Andrea came from a culture that valued education. As a parent, she was disturbed when it seemed that teachers did not know what to do with smart males of African descent.

Andrea complained that the educational process often slowed down her son to let the other children catch up, so that all students could be at the same place academically. She explained, “If he is that advanced, then move him up, but don’t have him when things come up, he holds up his hands and never get called on.”

When bright students are forced to wait for the others, it creates restlessness which can manifest in what is often labeled bad behavior. The effective teacher knows each student and uses assignments that motivate rather than dampen the desire for learning (Stronge, 2002). Andrea further added when speaking about her son, “Mom, they never call on me to give the answer, I will put my hand up to give the answer . . . and they never call on me.” This invisibility for intelligent Black students is formed when they follow the rules by raising their hands but then are ignored. In a classroom where teachers acknowledge cultural differences, there is room for expression of individuals.

The Use of Differentiated Instruction

All of the participants shared the importance of teachers who differentiated instructional strategies to meet the unique learning modalities of their students. Afia mentioned the importance of Gardner’s Multiple Intelligences, so that teachers could be reminded that there is no “one size fits all” in the educational process.

Afia

You look at Gardner’s multiple intelligences and you see some of those kids head on in the sciences. But we label them and they get bored and they are like, “Please, can you just stop talking and do something, let’s do something, build some bridges.” But they talk, talk, talk.

Afia makes the plea to teachers that Black children need hands-on learning. She challenged teachers to take a fresh look at Gardner’s Multiple Intelligences and consider the needs of the individual children in front of them. Black students are often educated in systems that reflect a banking education, devoid of elements of interaction (Freire, 1970). In contrast, effective teachers use strategies to manage the classroom, motivate students, and create an atmosphere for dialogue and interactions (Stronge, 2002).

Dorcas shared a conversation with a pregnant high school student in which she asked, “Where is your baby developing?” The student unknowingly said that her baby was developing in her stomach. From this response, Dorcas was able to introduce a conversation about the reproductive system. She stated, “I taught regular biology . . . and we were supposed to start with the protozoans, the amoeba.” I said, “No. Let’s talk about sex, because they like that.” Dorcas believed that it is important to begin with the students’ interest to teach the curriculum and get them actively engaged. Her strategy was Socratic, and she often began instruction with questions that would stimulate interest and encourage involvement. She explained, “I ask a lot of questions, that’s my style.”

Dorcas, as an effective teacher, realized the importance of opening the lesson from the point of student interest. She delivered the necessary “hook” as the motivation that sparked the interest of her students. Andrea believed teachers need to remember that all children do not learn in the same way or at the same rate:
Andrea

Teachers need to know every pupil doesn’t learn the same way. I learn by being present, hearing and interacting, asking questions. Some people don’t need to go, they can take the book, read it and they will do very well. That’s how they learn. Other people have to have the interaction and that’s how they learn. So you need to know.

In this narrative, Andrea challenges effective teachers to get to know the learning styles of each student to help them to be successful. Teachers can only arrive at these strategies and behaviors if they continuously reflect upon their practice.

**Being Self-Reflective**

In the final theme drawn from the data, effective teachers are lifelong learners who reflect upon their practice and reexamine their beliefs and practices based on their culture and training. Freire (1970) asserts that reflection is essential to praxis, which is the avenue for transformative teaching or teaching that transgresses (hooks, 1994).

Afia believed that a major problem with teachers who teach children of African descent is their lack of belief in their students’ ability and intelligence. She stated,

Most of us . . . don’t believe that our kids have the capacity to do stuff. We still believe that our kids need correction, so we think that school is about uniforms and discipline . . . and not about creativity and exploring.

Afia explained that schools for Black children are centered too much on structure that limits their creativity. Judicious reflection is needed to question the assumption that Black students are less intelligent and cannot succeed in STEM subjects (P. Aronson, 2008).

Fusia’s sole response here was on the importance of effective teachers to reflect upon how to support and encourage students:

Fusia

The teacher should be a cheerleader who will mentor [students] and who will be a good source that will serve as a resource for them to get what they need to get to take them to the level to achieve that STEM profession.

It is an expectation in CultRT that teachers communicate care. Teacher reflection is needed to insure that behavior demonstrates care that is received as care (Noddings, 1999). It is not limited to the teachers’ intention or hopes, but extends to the recipients’ perception and recipience.

Finally, Dorcas and Andrea call for teachers not to feel intimidated or threatened when students voice their opinions. They should establish a professionalism that enables students to ask questions and respectfully disagree with their teachers:

Andrea

Asking a question . . . maybe not agreeing or saying, “Look I didn’t understand that to be that way, could we go over that again” . . . Ok and once they put out their point of view, their point of view may not be correct, but allowing them to express it. And then being able to show them . . . I learn that, and I tried to teach that to my staff and my department . . . Sometimes you may know something is not going to work . . . but you have to tell the person, “Alright you go ahead and try it.”

Andrea felt that students should have the opportunity to share their opinions because that is how they begin to engage in a cognitive search for understanding. This is what she modeled as a corporate manager. These opinions may be naïve or limited, and not reflect what they really believe but the process of communicating encourages independent thinking and self-reflection. It can also be an indicator of their base of knowledge. Andrea is making a plea for student voice in the learning process. She felt that this process would serve to develop critical thinking and problem-solving skills. She calls for teachers to be confident and professionally self-assured, so that they are not threatened by the voices of their student. Freire (1970) asserts that for praxis to be effective, the voices of others must be included.

**Discussion**

This article explored the pertinence of CultRP and CultRT to address the attrition and lack of inclusion for females of African descent in STEM educational training. There often exist barriers to STEM pathways for Black students due to stereotype threats and assumptions regarding race and gender (J. Aronson et al., 2002; Steele & Aronson, 1995). It is further challenged by teaching strategies that use a banking educational model (Freire, 1970).

This article argued that CultRP (Ladson-Billings, 1994) and CultRT (Gay, 2000) offer effective teaching strategies and beliefs that are reflected in the behavior and practice of teachers who work with Black students. From the participant responses, four themes emerged that centered specifically on teacher strategies and behaviors. These are as follows: (a) Effective teachers believe in the capabilities of their students, (b) effective teachers create a cultural bridge between the home and the school, (c) effective teachers use differentiated instruction and strategies based upon Gardner’s Multiple Intelligences, and (d) effective teachers use strategies of reflection and praxis. From the voices of my participants, there is evidence that suggests that teachers who use the tenets of CultRP and CultRT experience positive academic outcomes for their students.
Challenge to Teacher: Care That Reflects a Positive Belief in Students

The belief system of teachers often reflects their position in the social hegemonic structure and affects their beliefs about the U.S. educational system. If they consider themselves as a representative of the dominant culture, they may enter the field with a belief system that views students of African descent as less capable and less intelligent (Martens, Johns, Greenberg, & Schimel, 2006; Steele & Aronson, 1995). This belief system and its comparative support structure often serve to reinforce the academic deficits in Black students (Wiggan, 2007).

These belief systems are reflected in the ways in which services are provided to students. In Afia’s narrative of the Black and Asian student, the Asian student may not get the help he or she needs because of the teacher’s misguided beliefs about Asians and their intelligence. The teacher openly shared her stereotype threats regarding the superior intelligence of Asians, while implying that the Black student was intellectually inferior (Martens et al., 2006; Steele & Aronson, 1995). These beliefs permeate the ways in which educational services are offered to students. Teachers are challenged to seriously contemplate their belief systems to recognize how these beliefs affect their behavior. To confront their personal biases, CultRP requires that they learn the culture of students, so that they do not employ misconceptions that impede the learning and equitable access to high-quality education.

Noddings asserts that caring involves an agent career and an agent who feels cared-for. In addition, caring is not a curriculum but a quality in the person who is actively demonstrating care (Noddings, 1999). Such teachers who value and respect their students tend to communicate this through their behavior. The result is a student who is motivated to apply more effort (Gay, 2000). The student must genuinely feel that the actions of the teacher are motivated by their desire to see them excel academically.

According to Tucker et al. (2010), successful African American male students at an inner-city school reported that they felt teachers treated them as if they mattered (cared about them) and conveyed high expectations. One student explained that when his grades slipped even a little, his teacher immediately noticed the trend and communicated the expectation that it was not acceptable and improvement is needed. This supports Gay’s (2000) assertion that CultRP are those who care about their students and demonstrate this care in their behaviors and verbal interactions.

Caring does not equate to condoning bad behavior nor does it imply an unfair advantage for the student. Ladson-Billings (1994) insists that CultRT promote classrooms that are intellectually challenging and reflect consistent expectations. CultRT classrooms demonstrate control and order. The caring teacher provides dependable and consistent structure that students learn to rely on to thrive. These classrooms help students develop confidence in their ability and accept their inabilities as areas that can be improved.

Dorcas was able to realize these goals for her students through firm boundaries and consistent classroom management strategies. She used her Jamaican dialect, familiar to her Afro-Caribbean students, and spoke in Spanish as needed in her class. Gay (2000) noted the importance of respecting and incorporating the dialects of African American students in writing projects.

There is a dynamic tension of care intertwined with pressure toward academic excellence and achievement. This also includes having classroom management strategies that increase reciprocal respect between teachers and students (Marzano, Gaddy, Foseid, Foseid, & Marzano, 2005). The classroom becomes a place filled with verbal affirmations. This serves to counter the stereotype threats that students may have received that are transmitted through media, peers, teachers, and the society at large (Smith & Hung, 2008). By using positive, relevant strategies, teachers partner with the family to build the self-confidence of their students.

Within this paradigm, Dorcas demonstrated her belief in her students’ ability through her expectation that they would succeed academically and replace her as a fellow professional. She challenged the beliefs of her colleagues with her straightforward expectation that her students would “fill her shoes.” This reflected her faith in her students’ potential to excel.

Challenge to Teachers: Providing the Link for Culture and School

By bridging the culture of home with the school community, teachers can create the link that supports the equitable academic outcomes for all students (Ladson-Billings, 1995b).

Social justice pedagogy requires teachers to bring the home and community culture together in a congruent relationship to be utilized as a resource for academic success (Cochran-Smith, 2004). CultRT and CultRP teachers see themselves as community partners with parents and share the responsibility for student excellence.

Nubia’s story from seventh grade illustrated this bridging. She explained how her English teacher took the time to inquire into her cultural background and develop a strategy for her success and assimilation into the U.S. educational system. Nubia, along with Dorcas and Afia, adopted this strategy of CultRP by actively getting to know the culture and backgrounds of their students to better serve their needs. Their instructional starting point was based upon their knowledge of the students’ culture to improve learning (i.e., setting up tutoring meetings, starting with their interests, and learning profiles).

Furthermore, teachers such as Dorcas and Nubia verbalized their expectations that their students were to become professionals. This validation helped bolster the students’
belief in their ability to succeed. They demonstrated their concern and knowledge of the issues their students faced and recognized the sociocultural complexities (i.e., perceptions of inferiority or of feeling “stupid”). They acknowledge that as educators they are an integral link to the home; they embraced the belief that parents, as the first teachers, genuinely care about the educational progress of their children.

**Challenge to Teachers: Creating Classrooms That work**

It is the culturally responsive teacher who creates a classroom climate that integrates students’ experiences into the lesson to better effect learning (Gay, 2000). In this way, A (teacher) + B (student) = (yields) C (increased learning output for student and teacher). This is because the teacher has learned about the culture and the learning style of the student and the student has learned the academic information, hence both are learners.

As CultRT teachers see knowledge acquisition as mining for information rather than banking, they take time to get to know their students and are able to create classrooms that encourage all voices in the room. This is why Dorcas advocates a Socratic method that employs questioning and classroom interaction. She explained that this was her “style.” CultRT teachers are not afraid of providing the platform for inquiry, self-expression, analysis, concerns, or opinions.

Andrea allowed staff members to voice their opinions to empower their ideas even if she did not agree. She afforded them the opportunity of having these considered for implementation. As such, CultRT teachers are challenged to encourage critical thinking skills that sustain student interest through conversation and student interaction. Effective teachers understand the power of classroom interactions and allocate power to their students through the inclusion of their voices (Delpit, 1988). They are not in a power struggle with their students, but rather they are working to actively empower them (Cochran-Smith, 2004).

**Challenge to Teachers: Developing the Art of Teaching**

Just as no artist or creator can run out of ideas, teachers who reflect upon their practice are constantly changing and making themselves anew for the diverse students in their charge. CultRT teachers have come to realize that teaching is not a scripted technical skill. CultRT teachers are not afraid to take risks to see their students excel. The challenge here to teachers is to engage in reflective behaviors that can lead to improved practice to ensure that all students are successful learners.

Constant reflection of practice is needed to eradicate stereotype threats that reveal a belief in the lack of intelligence of students (Steele & Aronson, 1995; Martens et al., 2006). These biased communications, whether verbal or non-verbal, erode the self-confidence of students and become a self-fulfilling prophecy that impedes their academic progress. To build the self-confidence of students, teachers must understand their identity and situate it in the hegemonic structure of society. Regardless of race and gender, there is privilege and power that is derived from being a teacher in the room. In subtle conversations like the one regarding the students and Special Education, beliefs are presented based upon racial constructs that affect the way services are provided.

White schools and neighborhoods often set academic benchmarks that are used as the standard for comparison (Wiggan, 2007). When Black schools and neighborhoods are compared with this set of standards, which are often culturally biased, Black schools often fall short (J. Aronson et al., 2002). This indicates that Whites continue to be the standard measuring rod for academic success irrespective of socioeconomic, language, or cultural perspectives.

Furthermore, teachers are challenged to resist the beliefs that parents of Black children do not care about the educational progress of their children. Too often, teachers use this misbelief to excuse their ineffective teaching and minimize their responsibility in the academic progress of their students. Lynn et al. (2010) conducted an 18-month ethnographic study at a failing school in the mid-Atlantic region of the United States. Their findings overwhelmingly demonstrated that teachers, administrators, and counselors believed that student underachievement was due to lack of motivation and lack of family support. They further believed that the poor outcomes had nothing to do with their performance as teachers or support staff. These misconceptions serve to excuse the ineffective learning environment by placing blame solely at the feet of the learner and their parents. What it does not do is consider the culture and community that these students represent which is essential in forming a partnership that produces academic success.

**Conclusion**

With the changing demographics and increased percentage of immigrant students in the United States, there is a need for teacher training programs that will establish continuity between home and school. In addition, educators must be trained or retrained to facilitate high levels of student learning regardless of socioeconomic or cultural differences. This may require teachers to reflect upon their beliefs regarding the ability of students of African descent. The basic tenant of CultRP and CultRT is that students make academic progress and become critical knowledge producers by engaging their curriculum. This is not negotiable. As successful women in STEM, the voices of my participants proved insightful in validating and offering support for CultRP and CultRT.

This study focused on the behaviors and beliefs of teachers. However, principals, educational leaders, and support staff are challenged to reconsider the ways in which their beliefs affect policies and procedures that maintain hegemonic structures.
Effective teachers need schools and administrators who allow them to transgress the normative boundaries to eradicate barriers that restrict STEM access for Black students. “In-service training is needed for all school personnel from the ancillary staff to the classroom teacher to increase the cultural competence . . . and foster respect for students and their families of origin” (King Miller, 2013, p. 183). There is an appeal to principals and school superintendents who are tasked with budgetary allocations to show their support by funding such initiatives.

Further study is needed to provide evidence on the ways in which CultRP and CultRT are effective in classrooms with immigrant Blacks and Latina students. This study is limited in that it reports from a small purposive sample and focuses specifically on females. This study reported only on the ways in which CultRP and CultRT concurred with the effective teaching strategies employed by or recognized by these Afro-Caribbean females in STEM careers.

Ultimately, if the United States is to be effective in the global science, engineering, technological, and mathematics market, it is important to challenge views regarding gender and race constructs. There is no room for the exclusion of sectors of the population based upon racial constructs. Effective teachers acknowledge that they are agents of change for all students to achieve academic success.

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