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Elementary Teachers' Beliefs of African Americans in the Mathematics Classroom

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The underlying theme of the Equity Principle in the *Principles and Standards for School Mathematics* (NCTM, 2000) is all students can learn mathematics. Unfortunately, many African American students are consistently demonstrating low mathematical achievement and many educators refuse to acknowledge racial inequities faced by African Americans in the mathematics classroom. In this qualitative study, twelve elementary mathematics teachers from four school districts in the Midwest are interviewed about their beliefs about teaching African American students and teaching mathematics to African American students. The teachers in this study believe African American students can and do succeed in mathematics, which is contrary to the belief held by some educators that African American students cannot do outstanding work. The findings in this study reveal that mathematics teachers need productive beliefs specifically related to African American students, how African American students learn, and effective teaching practices for African American students in order to teach mathematics through an equitable lens.

Keywords: African American students, elementary, teachers' beliefs

Introduction

The underlying theme of the Equity Principle in the *Principles and Standards for School Mathematics* (NCTM, 2000) is all students can learn mathematics. Unfortunately, many African American students are consistently demonstrating low mathematical achievement (Lee, 2004; Lubienski, 2002) and many educators refuse to acknowledge racial inequities faced by African Americans in the mathematics classroom (Rousseau & Tate, 2003). Instead, they live in a “colorblind” society. Teachers upholding this colorblind ideology argue that good teachers are good for every student and equitable outcomes will automatically occur (Gay, 2000; Martin, 2007). However, this ideology contributes to ignorance on the impact of racism and racial issues in the mathematics classroom (Rousseau & Tate, 2003).

It is not only colorblind teachers who hold beliefs that do not facilitate the academic participation and learning of African American students. For example, some public school teachers hold the belief that African Americans are lazy and cannot learn (Martin, 2007), and about half of White Americans believe Blacks are unintelligent (Landsman, 2004; Smith, 1990). These beliefs may be grounded in the longstanding belief that Blacks were generations behind Whites with regard to skills and

intelligence in an evolutionary sense (Anderson, 1988; Spring, 2005). These beliefs play a powerful role in the poor achievement of African American students, and lead to low expectations that deny access to problem solving and higher-order thinking skills in mathematics. Consequently, achieving equity in mathematics education, specifically in relation to African American students, requires teachers with productive beliefs. The purpose of this manuscript is to report the findings from a research study of elementary teachers' beliefs as it relates to the instruction of mathematics to African American students. The research questions underlying this study are:

What beliefs do elementary mathematics teachers have about (1) African American students, and (2) teaching mathematics to African American students?

Teachers' Beliefs

In a study done by Thompson (2009), a Mindset Questionnaire was administered to 143 Texas educators and 94 pre-service teachers in California. The study found that 94% in-service and 90% practicing teachers believed most teachers do not know how to work effectively with African American K–12 students, thereby hindering success. Furthermore, the questionnaire asked teachers (white and black), pre-service teachers, and administrators about the

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beliefs of educators of African American students. Fifty to 75% specified that the majority of teachers do not believe African American students are as intelligent as other ethnic groups, and an overwhelming majority of respondents believe that teachers do not treat or view African American students the same as other ethnic groups.

These negative beliefs affect teachers' perceptions of African American students, and ultimately their instruction. According to Thompson (2007) many educators and policymakers believe that African American students are lazy, incapable, and inferior. No matter what type of reform is mandated or implemented, these individuals believe that African American students will never get it. From a study conducted by Thompson (2004) in the summer of 2002, in-service teachers believe African American students do not want to learn. Thompson (2007) further indicated the following two beliefs are interwoven in the framework of America: Whites are superior to all ethnic groups, specifically African Americans, and Whites deserve to be leaders because they are more intelligent and are hard workers. These beliefs lead to low expectations of African American students, particularly in the mathematics classroom. Researchers found that a student's race is a determining factor in how a teacher will treat the student (Thompson, 2010).

In another study, Love and Kruger (2005) examined the beliefs of teachers using a survey adapted from a study of highly effective teachers of African American students conducted by Ladson-Billings (1994). The researchers found 95% of the teachers believed that learning from students is just as important as teaching them. Yet, 78% of the teachers believed it was their job to disseminate knowledge. Participants also believed students' race, culture, and ethnicity were important to teaching, but responded they did not associate students with any particular race or culture—they only saw children. This statement affirmed the notion of colorblindness described by Rousseau and Tate (2003).

Learning Styles of African American Students in Mathematics

A learning style is "a way of perceiving, conceptualizing, and problem-solving" (Willis, 1992, p. 261) in order to understand a particular phenomenon. African American students tend to be more field dependent learners and rely less on analytic reasoning (Malloy, 1997). Stiff (1990) writes that analytic teachers and learners place order and structure on the world to understand it. These types of learners are focused on the importance of precision, directness, and conciseness when learning mathematics. Competition in this type of atmosphere is both acceptable and desired. However, many African American students prefer learning mathematics holistically in a cooperative learning environment (Slavin & Oickle, 1981; Stiff, 1990).

Malloy and Malloy (1998) argue the learning preference of African American students in a mathematics classroom is holistic, field-dependent, and interdependent. This learning style suggests that mathematics instruction should include instructional strategies that allow students to focus on the whole and participate in social interaction. Mathematics teachers must incorporate the learning preferences of African American students during mathematics instruction. Currently, the learning preferences of African American students are ignored in mathematics instruction, which exacerbates the mathematical underachievement of African American students.

Method

I contacted district administrators in four districts in the Midwest to identify teachers who: (1) teach mathematics in grades 3–5, or grade 6 if under the umbrella of an elementary school; (2) have a mathematics class with at least 20% African American students; (3) have a minimum of 4 years of teaching experience; and (4) were recommended by knowledgeable mathematics educators based on competence in teaching African American students. I provide more descriptive information about each participant in Table 1 (names are pseudonyms).

Data Collection and Analysis

The data sources included two semi-structured interviews (Merriam, 1988). As an African American female researcher who conducted the interviews, I had to build and maintain an open, trusting relationship with the teachers since this study centered on topics most teachers do not freely discuss. I communicated my passion for improving mathematics education for African American students and the need to understand their beliefs related to teaching mathematics to African American students. During one of the interviews, a white teacher stated,

Tell you the truth I had one child [say] 'my momma told me that I didn't have to listen to no white teacher.' So, you know I've heard all those arguments before you know white teachers can't teach black children. I'm like okay, well does that mean that black teachers can't teach white kids? Does it go the other way?

I believe all the participants felt comfortable to freely discuss their beliefs about teaching mathematics to African American students.

The first interview established a foundational understanding of the teachers' beliefs. For example, one question I asked was: "What are the needs of African American students when learning mathematics?" The second interview allowed me to probe for additional ideas and/or clarification to establish a shared understanding

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Table 1. Participants

Teacher	Ethnicity	Grade Level Taught During Study	School District Context	Percent of African American Students Enrolled in District	Years Teaching
Mrs. Lewis	Caucasian	Fifth	Webster School District, Public, Small City	22.6%	4
Ms. Jenkins	Caucasian	Third	Webster School District, Public, Small City	22.6%	6
Ms. Hale	Caucasian	Fourth	Webster School District, Public, Small City	22.6%	4
Mrs. Knox	African American	Third	Khanna School District, Public, Urban	99.2%	11
Mrs. Mitchell	African American	Sixth	Khanna School District, Public, Urban	99.2%	20 plus
Mrs. Savage	Caucasian	Fourth	Khanna School District, Public, Urban	99.2%	28
Mrs. Jones	Caucasian	Third	Hartville School District, Public, Suburban	68.1%	12
Mrs. Thomas	African American	Third	Hartville School District, Public, Suburban	68.1%	13
Mrs. De Vries	Hispanic	Third	Stephens School District, Public, Urban	64.9%	4
Mrs. Stevens	Caucasian	Fifth	Stephens School District, Public, Urban	64.9%	23
Mrs. Wilkins	African American	Fifth	Stephens School District, Public, Urban	64.9%	8
Mrs. Fewell	African American	Fifth	Stephens School District, Public, Urban	64.9%	9

of the teachers' beliefs about African American students and teaching mathematics to African American students (Strauss & Corbin, 1998). For example, a question asked during the second interview was: "You have been asked to give a presentation to your colleagues on what facilitates and hinders the success of African American students in mathematics. What would you discuss during your presentation?" The time lapse between interviews was approximately two months. Each interview lasted approximately one hour.

The data were coded using a microanalysis approach with nodes related to teachers' beliefs about African American students in the mathematics classroom (see Table 2). I analyzed the data using a data reduction approach (Miles & Huberman, 1994) along with a constant comparative approach (Glaser, 1965). I mapped out the teachers' beliefs and looked for saturation in the data as I categorized the quotes. Reliability was confirmed with another faculty member.

Results

Mrs. Savage understands the implications race has on teaching predominately African American students, so she has invested time and taken the initiative to read about African American history and culture. She realizes she has not experienced, nor had to deal with the social realities of being black in today's society, so she understands the necessity to learn more and discuss it. She elaborates:

I always try, I always try to ask and learn more and understand. That's who I am, you know. And I think talking about it eliminates, well it eliminates fear. It also brings understanding and appreciation. Just knowing somebody's background gives you a little bit of insight as where they're coming from. And so it helps you deal with them better, and teach them better. (Initial Interview, 2009)

Unfortunately, teachers living in society have constructed negative biases and stereotypes against African Americans (Thompson 2007), and many times teachers fail

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Table 2. Coding Categories for Teachers' Beliefs

Teacher's Beliefs
<ul style="list-style-type: none">• Beliefs specifically related to African American students• Beliefs related to how African American students learn• Beliefs related to effective instructional practices for African American students• Beliefs related to themselves as teachers and the roles they play as they teach mathematics

to acknowledge they have stereotypes and biases. But, in order to teach effectively, teachers have to recognize that they exist and then set them aside so they can relate to students. Ms. Jenkins admits:

I have these stereotypes in my head you know things that were maybe told to me or I heard on TV or you know. I don't think I can say I don't have stereotypes, I think I do. But for me to be conscious and say the stereotype is exactly that. It is a stereotype. But, you know when kids walk into my room and adults too I try not to have the stereotype. I try to get to know them. Even if that stereotype comes into my head, it's like I have to be conscious and say I don't know this person really on the first day of school. And I'm just getting to know them. (Final Interview, 2009)

It is imperative that teachers are open-minded and do not allow negative biases and stereotypes communicated by previous teachers influence how they interact with students.

The participants of the study believe teachers need to establish an environment conducive to learning, not one that is demeaning to African American students. Mrs. Jones witnessed teachers talking down to their African American students causing them to shut down, instead of taking the time to explain the mathematical process. Mrs. Jones believes this is the wrong way to respond because, as she said, "A lot of times we don't know where they're coming from or maybe they should know it at that point, but they just don't" (Final Interview, 2009). As Mrs. Lewis reflected over the previous year, she admits she was scared of a fourth grade African American boy at her school, and she did not want to have him in her class. She reported, "He would yell, 'Oh, you all are a bunch of old white women.' He was not scared of anything" (Final Interview, 2009). Mrs. Lewis realized she had to detach herself from his actions so she would not form any negative biases against him. It is vital teachers take the time to build relationships by being honest and sincere with their students and themselves. Mrs. Mitchell claims, "Kids can feel when you're genuine with them." She realizes some of her students sometimes come to school with a lot of baggage, and she wants her students to know she is there for them, to listen to them. She notices

that as her relationships with students strengthen, some of them mistakenly call her "Momma." Mrs. Mitchell explains:

You got to get to know these babies. It's just they'll do anything for you if they think that you are on their side. When they find out, you know, she's there for me they'll do whatever. If they feel neglected, if they feel like you know, you are just being mean, you know, or you don't understand them, then they will shut down. (Initial Interview, 2009)

All the participants believe African American students can learn mathematics through playing mathematical games, discussing what they learn, and participating in hands-on activities and mathematics workshops. Mrs. Stevens believes African American students are not book driven. They are not pencil-paper driven. They do not learn best when the teacher lectures. Instead, they learn best when they are given opportunities to explore because they are social, visual, auditory, and kinesthetic. Similarly, Mrs. Knox believes everyone has different learning styles. She contends teachers must "key in to what makes them [students] tick and tailor your lesson there" (Initial Interview, 2009). In order to do this successfully, Mrs. De Vries believes teachers should notice and pay attention to the needs of African American students. She contends teachers should be aware of what African Americans are doing and be sensitive to whether they understand or misunderstand mathematical concepts.

The participants also understand that some students struggle with mathematics and are not all 'A' students. Mrs. Mitchell encourages her students on a regular basis:

Tomorrow is going to be a better day than today. You know if we had a good day or a bad day, but tomorrow is going to be a better day and you just keep reinforcing that with the kids, and you know I feel like it helps. (Final Interview, 2009)

She believes all her students are successful. "Today you walked in, and guess what, you couldn't even multiply two times two. But look at you now. You're able to do prime factorization of any product" (Initial Interview, 2009). Mrs. Thomas does not want students to experience frustration or say that mathematics is hard because they have to solve a problem one particular way. She believes this is one of the reasons why there is an achievement gap in mathematics among African American students and other ethnicities. Consequently, Mrs. Thomas encourages students to use a variety of strategies to solve mathematics problems. Mrs. Thomas wants her students to understand there are many different ways to solve mathematics problems.

However, Mrs. Savage realizes that even the most versatile teacher experiences challenges during his/her teaching career. For example, Mrs. Mitchell finds it

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challenging when her students do not learn. She wants to “make” them understand. She comments:

I guess the most challenging aspect of teaching [mathematics] is realizing that no matter what you do, sometimes you just can't help everybody. And that's a weakness of mine because I'm always trying to lead the horse to the water, and even though I know you can't make them drink it, I'm always trying to push his head down. You know what I'm saying? And that's the hardest part for me is letting go because I don't want to let go. I always feel like I got to try something else. I got to try this. I got to try that. And that's the hardest part for me. (Final Interview, 2009)

Yet, Mrs. Mitchell does not “blame” the students when they do not perform well in mathematics. She recognizes that there are other influences. For example, she believes her teaching may hinder student success at times. She reflected on a time when 75% of her students scored a 60 or below on a test. She acknowledges that the students' low performance was the result of her instruction and that she needed to approach the concepts from a different angle. In addition, she recognizes that students hear messages about mathematics that hinder their success. For example, she has found that some parents say they were never good at mathematics, or that mathematics was not their favorite subject. Mrs. Mitchell believes that hurts her instruction every time because it puts a stigma on the child. The child recognizes that it is okay for him not to be good at mathematics because “Momma said she wasn't good” (Initial Interview, 2009). But, Mrs. Mitchell contends she still must move this “baby from point A to Z” (Initial Interview, 2009) so he or she can be successful.

Discussion

Teachers' beliefs significantly influence their instructional practices (Thompson, 1992). In other words, teachers' beliefs act as a filter and shape how a teacher thinks about children and teaching, as well as how she structures her classroom environment. Although researchers have described beliefs as a “messy construct” with multiple meanings and interpretations (Aguirre & Speer 2000; Pajares, 1992; Phillip, 2007), Barlow and Cates (2006) argue beliefs affect how teachers view their students.

The majority of teachers, according to Thompson (2009), do not believe that African American students are as intelligent as other races. Additionally, society believes that African American students do not have the ability to do outstanding work (Thompson, 2007). The results of this study are contrary to these typical beliefs held by some educators. The teachers in this study believe African American students can and do succeed in mathematics. Although the participants realize that everyone has biases, they contend

that teachers cannot let those assumptions contaminate or influence instruction. Ms. Jenkins commented that she had to acknowledge her stereotypes and consciously deal with them so she could get to know each student as individuals. Research has shown that teacher expectations generally act as a self-fulfilling prophecy (Rosenthal & Jacobson, 1968). That is, teacher beliefs influence how they interact with their students. Furthermore, students typically act in ways their teachers expect them to act. Mathematics teachers cannot let negative biases influence how they interact with students. They must reach out to students and give them opportunities to be successful. More importantly, teachers must acknowledge their biases toward specific students and take the time to build relationships with their students. Each year, teachers must enter their classrooms with the mindset that this is a new group of students and it is their job to help them learn mathematics. Consequently, according to Mrs. Mitchell and Mrs. DeVries, teachers must invest time to understand African American students.

Participants realize their students have different knowledge and experiences. As a result, they understand they cannot instruct their students using one mathematical strategy. They must implement a variety of instructional strategies so all students understand. Teachers must organize and adjust their instruction according to the needs of their African American students. Thus, the participants believe that African American students learn mathematics when they are actively engaged in the lesson, have opportunities for mobility within the classroom, and opportunities to use multiple modes. These results agree with Willis' (1992) summary of the learning preferences of African American students. Boykin (1978) also supports these findings suggesting African American students learn faster when incorporating movement in lessons, known as behavioral verve.

The participants of the study believe teachers should not yell at African American students. If students feel you do not care about them or if you are mean and hateful, they will not work. The participants believe you have to refocus behavior so students can learn. Additionally, they believe you have to create a climate where students feel comfortable participating and knowing that their ideas and thoughts are valued. Jacqueline Jordan Irvine (2009) concludes that since African American students tend to be more teacher-dependent than other races, they do poorly when they do not have a positive relationship with the teacher.

Contrary to Milner's (2006) findings that many white teachers are not comfortable talking about racial issues, Mrs. Savage (a white teacher) reads literature about African American history and culture and seeks advice from her African American colleagues to understand her African American students better. Similar to Delpit (1995), Mrs. Savage tries to understand by asking questions and talking about racial issues because these interactions help her eliminate fear, become a better teacher, and facilitate

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communication among her students in the mathematics classroom.

Thompson (2010) reports that researchers have found that, frequently, a student's race determines how his or her teacher will treat a student. Unfortunately, in many public schools in the United States, race, specifically that of African Americans, has negatively influenced teaching and learning (Lewis, 2003; Lipman, 1998). Traditionally, the influence of race on mathematics instruction has been identified in the literature under a deficit paradigm (Lubienski, 2002; Waxman & Padron, 1995). But, the findings in this study do not view the race of African American students as a deficit. Instead, it is viewed as part of African American students' identities, which should be looked upon positively in the mathematics classroom. Teachers need productive beliefs specifically related to African American students, how African American students learn, and effective teaching practices for African American students in order to teach mathematics through an equitable lens.

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Equity in Mathematics Assessment

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We, as teachers and educators, believe that every student has their own learning style. NCTM (2000) states, “Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students” (p. 12). Teachers often prepare differentiated instruction, but do not prepare differentiated assessment. Not all students show their understanding of mathematics in the same way. This paper discusses equity in mathematics assessment, which means how teachers promote equity in classrooms with various assessments. This paper also provides ideas and examples for assessments in mathematics.

Keywords: equity, assessment, differentiated instruction

Introduction

As mathematics teachers and educators, we should believe that *all* students have the capacity to learn mathematics. We know that students are not born with a mathematics gene, and each of our students has the potential to develop mathematical reasoning skills. These skills can be developed at home and in schools, and predominately in mathematics classrooms. The idea that all students have a right to equal access to the study of mathematics is referred to as equity. According to Croom (1997), “Equity in mathematics education implies fairness, justice, and equality for all students so that they may

achieve their full potential, regardless of race, ethnicity, gender, or socioeconomic status” (p. 2). A position of the National Council of Teachers of Mathematics [NCTM] notes that teachers should encourage students to share different solutions, interpretations, and approaches and should find multiple ways to assess students' mathematical understanding (NCTM, 2008).

However, not all students show their mathematical understanding in the same way. Some students prefer to make presentations, whereas others may prefer to write a paper or explain their solutions in print. Some students are better at taking written tests while others perform better in teams or by completing individual projects. Achieving equity