African-American Women in Mathematics

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Teacher-Student Relationships

Literature Review - African-American students learn from direct contact with teachers and peers, taking a holistic relational, and intuitively stance. Teachers of African American students have to be more than effective teachers. Instead, they must also be “culturally responsive teachers who contextualize teaching by giving immediate needs and cultural experiences of their students.” (Irvin, 1992, p.82)

Expert Interview – Set them up as leaders in the classroom. “If you will try, you will pass.”

Student Interviews – Examples of good and bad teacher student relationships.
- She asks a lot of questions, teachers laugh and ask “Why would you ask that?” They don’t like that, it’s frustrating for them.
- Wishes teachers would consider everyone and make sure they understood, instead of moving on.

Math teacher was very energetic, animated, passionate, and interesting. Student doesn’t like math but teacher made it more interesting and was very encouraging. Student wouldn’t have been as engaged, was in teacher’s office every day.

Geometry teacher, made it seem simple, broke it down. Could go over their tests, and he was more encouraging. Laid back teacher, if you wanted to learn, she was there, and became friends.


Preferences for Learning Math

Literature Review - Mathematical Literacy – An individual’s capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments, and to use and engage with mathematics in ways that meet the needs of individuals’ life as a constructive, concerned and reflective citizen. (OECD’s Program for International Student Assessment (PISA), 2000)

“African American students usually learn in ways which are characterized by social and affective emphases, harmony with the community, holistic perspectives, field independence, expressive creativity, and nonverbal communication.” (Dill, 1999)

Expert Interview – “Math is a very sequential based content area and if there are any gaps it makes it difficult.”

“People forget the mathematical formula because they haven’t been able to build it into something useful in their life, so they lose it.”

Student Interviews – Need applications to the real world and fun teachers.
- I like to use the book as a secondary source, so if I don’t understand the lesson I’ll go home and look in the book, and excerpts in the book.

Wants teaching to come from outside the book. “I think that would help, like having other activities.”

Programmes for International Student Assessment (PISA). Organization for Economic Co-operation and Development (OECD), 2003

Self-Confidence

Student interviews - “I never been confident with math and I think that affects how I do. I think that I would do better if I was more confident.”

Student interviews – One mother of a student was the only role model. Most unconfident in mathematics.
- Her mom is her role model for math, dad is a veterinarian. Rates herself an 85 because if she is taught well then she will do well [rating scale from one to ten]

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Themes

From interviewing 6 women Summer Academy and REAL Program participants from Summer 2008 and 2 researchers and principals from colleges and high schools the following themes were identified:

Teacher Student Relationships

Parental Involvement

Preferences for Learning Mathematics

Lack of Role Models

Self Confidence

Why African-American Women Are Not in Mathematics

Purpose

As an African American woman studying mathematics I realized the lack of other African American woman in my math courses. Even though the number of African American men in these courses is very small as well, it is still significantly larger than that of women. I am curious and excited to find out why this occurs. Since there continues to be studies that show the same trends of African American students falling behind their peers when it comes to mathematics I feel that there are answers to why this occurs and what can be implemented in the classroom to change these statistics (Ambrose, Levi, and Fenemma, 1997).

Research Questions

Over the summer I took the time to explore a research question which really interested me. The question of interest: What factors influence African American women to stay away from mathematics in college? A second question of interest looks at families, friends, and media and their influence on the choice of a college major for African American women. Lastly what do African American women need in order to be successful in mathematics.

Methodology

The African American Women in Mathematics Project uses qualitative methods to examine factors influencing the choice of college major by African American women and family influence of major. I created a list of interview questions that I asked several African American women involved in the REAL Program and Summer Academy. This data heavily supported the literature that I read as well as did interviewing professionals in the math and/or education field.


Conclusions

If I could change the way African American students are taught mathematics, I would:
- Provide appropriate role models for African American students from industry and high end.
- Use different approaches in class to accommodate African American student learning styles.
- Stress more on problem solving in mathematics.
- Stress positive feedback on advances in mathematics learning by students.
- Educate teachers through workshops on motivation, conversation style, and social preferences of students.

Conclusion

Self Confidence and Lack of Role Models

Literature Review – “In particular, many urban African American parents usually work during school hours and have a very hard time trying to get work off in order to participate in their child’s school functions.” (Struchens, Thomas, & Petek, 1997)

Student interviews – Parent attitude and involvement encouraged and motivated to do well in math.
- “My dad said ‘Math and English are most important’” studied in Africa. He would help her and if she couldn’t he would take her to the library, wouldn’t let her give up.

- “Her parents were really strict with school, wanted her to get A’s in everything. They would show more happiness when they see A’s ‘Especially with math and science, they’ve always been really strict, you have to get A’s in math and science.’” In her culture you are expected to be an engineer or doctor.

Parents always pushed her to learn. “Her dad always said ‘Without an education you’re not going to get far.’”

- Parents pushed her to challenge herself, didn’t understand the math so she turned to brother, but surprised him so she was on her own. More encouraging for math/science. Encouraged her to go past the requirement.

African American students are affected by culture related to mathematics learning. Students’ self-perceptions as members of the mathematics community are shaped by culture. Also, since cultural and academic knowledge are oppositional, students’ indigenous skills are not valued (Bogdan and Bilen, 1998).

African American students disassociate from the learning process as a result of becoming vulnerable to the stereotypes and internalizing the failing expectations of them in mathematics. (Spencer, Steele, and Quinn, 1999).

Expert Interview – Principal of 22 years had never interviewed an African American woman wanting to teach math. If we have students who are underrepresented in total in our educational system, taking one of the hardest areas that we have would make it even more challenging.

Student Interview – One mother of a student was the only role model. Mostly unconfident in mathematics.
- “I’ve never been confident with math and I think that affects how I do. I think that I would do better if I was more confident.”

- Her mom is her role model for math, dad is a veterinarian. Rates herself an 85 because if she is taught well then she will do well [rating scale from one to ten]