

# ***Guest Editorial...Preparing Preservice Teachers to Work in Diverse Mathematics Classrooms: A Challenge for All***

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Educating quality teachers to work effectively with diverse student populations is a challenge yet to be met by most educators. This challenge is imperative in mathematics education where people often accept disparities in achievement across various student backgrounds as being normal, natural, inevitable, explainable, or even acceptable (Secada, 1992). For example, a common misconception is that African American, Hispanic, White female, and poor students are not “mathematically inclined” and must work harder to succeed. In contrast, Asian and White male students are often seen to possess an innate ability to succeed in mathematics. Seeing students for what they know and can do mathematically, instead of what they look like or where they live, and understanding the similarities and differences in students’ world experiences are goals mathematics educators need to pursue when preparing the next generation of teachers.

As a mathematics educator, I strive to change my students’ image of mathematics learners and instill in them a belief that *all* children can learn mathematics. As an African American female mathematics educator, I also want my students to explore issues relating to gender, ethnicity, and class, and to investigate how these issues are enacted in mathematics classrooms and schools. In my experience, however, most preservice teachers have limited experience working and interacting with people different than themselves. Ninety-five percent of the preservice teachers I have taught are White middle-class females who attended schools with very little diversity in the student body, faculty, and administration. The few preservice teachers that have attended racially mixed schools have reported that they rarely interacted with people of different racial and ethnic backgrounds. As a result of their experiences, most of these preservice teachers envision themselves teaching in schools similar to the ones they attended where the students are like them.

Recent demographics suggest an increase in the likelihood that today’s preservice teachers will teach students whose ethnic backgrounds differ greatly from their own. The National Center for Educational Statistics (NCES, 2001) reported that minority students comprised 38 percent of the total US public school enrollment in 1999. These enrollments differ by region and range from 24 percent minority student enrollment in the Midwest to 47 and 45 percent in the West and South, respectively. The NCES further notes that the overall number of minority student enrollments is increasing and that Hispanic students are the fastest growing student population in US elementary and secondary schools. As the number of students of color entering our public schools increases, so does the need for teachers prepared to accommodate the mathematical needs of a wide variety of students.

Now more than ever, mathematics educators must meet the challenge of preparing preservice teachers to work effectively in diverse mathematics classrooms. As Sleeter (1997) recommends, the professional development of teachers at the preservice level should include research on the professional development of teachers, mathematics

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reform, and multicultural mathematics. The challenge to mathematics educators is to insure that as our students examine mathematics, teaching, and learning, they are provided with opportunities to: (1) engage in critical inquiry about equity issues, (2) gain experience in working with diverse students, and (3) explore the contributions of various cultures to the field of mathematics. These opportunities allow prospective teachers to examine school mathematics practices, reflect on their beliefs, and hopefully become agents of change.

### Engage Preservice Teachers in Critical Inquiry about Equity Issues

Educating preservice teachers to work effectively with diverse students requires that they engage in critical inquiry about equity issues and about their influence on the mathematics education experiences of students; they need to know “the influence of students’ linguistic, ethnic, racial, and socioeconomic backgrounds and gender on learning mathematics” (NCTM, 1991, p. 144). Tracking, ability grouping, learning styles, testing, family-school connections, and technology are a few topics that should be addressed in mathematics teacher education courses. Many preservice teachers have benefited from common school practices like being placed in high-track mathematics classes. Helping them reflect on their experiences and think about the experiences of others challenges their conceptions and helps them question the status quo so they can become proactive in their classrooms and schools.

Many preservice teachers continue to view mathematics as a White male-dominated subject. As one of my preservice teachers stated on the first day of class last semester, “Everybody knows that boys are smarter than girls in math.” Therefore, gender issues and the inequitable experiences of males and females in mathematics classrooms need to continuously be examined and discussed. Preservice teachers need to consider alternative explanations for the mathematical success and failure of students. Critically examining the experiences in school mathematics of students from various cultural backgrounds must be a central part of the discussion of equity issues in our mathematics education courses. These examinations must move beyond the experiences of Black and White students to include the experiences of students from different ethnic, linguistic, and religious backgrounds.

Being uncomfortable is an almost unavoidable part of the discussions but is necessary to grapple with important educational problems. Students need to feel part of the conversation rather than the object of a lecture. They need to feel free to articulate their views and to consider and respect the views of others.

### Provide Experiences Working with Diverse Students

Preservice teachers need experience working with diverse students to examine how all students learn mathematics. Thus we must expand our definition of diversity and not limit it to students from different racial backgrounds. Diversity must include various religious, linguistic, educational, and socioeconomic backgrounds. The ideal experience would provide preservice teachers with an opportunity to work in schools that reflect diversity. They can explore the mathematical knowledge of various students, observe school practices, and observe the teaching of mathematics across the curriculum. However, a community project where students work with a local tutoring program, General Education Development (GED) program, low-income housing project, homeless shelter, church, synagogue, or mosque can also provide valuable experiences. The goal is for students to interact and work with people different than themselves.

In any setting, however, care must be given to make sure that students' misconceptions are not validated through these experiences. For example, if students work only with low-achieving African American students and high-achieving Asian students, these experiences can reaffirm their beliefs about which students can and cannot do mathematics. Therefore, a range of students should be chosen whenever possible. More importantly, class discussions that draw implications for the teaching and learning of mathematics must follow all out-of-class experiences.

#### Explore the Contributions of Various Cultures to the Field of Mathematics

In addition to critically examining equity issues and working with diverse students, preservice teachers need an opportunity to learn of the contributions from various cultures to the field of mathematics. There are several resources available that provide multicultural mathematics materials. For example, patterns and place value can be explored through African and Asian artifacts and games such as Mansala and Tangrams, respectively. Other games like Pachisi (India), Nyout (Korea) and Senet (Ancient Egypt) are excellent to develop children's logical thinking. The old playground favorite of hop scotch, invented by the Romans, is yet another example to help young children explore counting strategies. These activities provide preservice teachers with a greater awareness of the contributions of various cultures to mathematics.

Educating preservice teachers to work effectively with diverse students requires that they learn to identify multicultural instructional materials and discuss their implications for teaching mathematics. Preservice teachers need help distinguishing between materials that Chappell and Thompson (2000) call "culturally contextual" from materials that are "culturally amendable." As they explain, culturally contextual materials have a cultural context that is essential to the message or material. In contrast, culturally amendable materials may have people of color as the main characters or be written in another language such as Spanish, but the message is not dependent on the culture. In other words, the characters portrayed can be of any ethnic persuasion. Learning the importance of each type of material and its implications for working with diverse student populations is important for preservice teachers' professional development.

#### Concluding Comments

Our teacher education candidates must leave our programs with an awareness of students' mathematical thinking and an ability to look toward and beyond students' gender, race, creed, and family income. Preparing preservice teachers to work in diverse mathematics classrooms rests with every mathematics educator. We must reflect on whether we are providing our students with the best education possible and increase our knowledge of multicultural mathematics education. Addressing diversity in our teacher education courses does not end with our students. We need to serve as resources, collaborating with our colleagues to expand an understanding of multicultural mathematics teaching, learning, and research. Educating preservice teachers to work in diverse mathematics classrooms may be a challenge, but it is also an exciting opportunity to learn about our students and to learn new approaches to reach *all* students mathematically. The next generation of teachers and students deserves to experience the wonders of mathematics teaching and learning while celebrating the diverse backgrounds of all.

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