

# Attending to Diversity and Equity in the Recruitment and Preparation of K-12 teachers of Mathematics

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# Demography (2012)

<b>Ethnicity</b>	<b>AZ</b>	<b>USA</b>
White	84.3%	77.9%
Black	4.5%	13.1%
Native	<b>5.3%</b>	1.2%
Asian & Pacific	3.4%	5.3%
Two Races	2.5%	2.4%
Hispanic	<b>30.2%</b>	16.9%
White, not Hispanic	57.1%	63.0%

# Demography (2012)

<b>Ethnicity</b>	<b>AZ</b>	<b>USA</b>	<b>AZ teach.</b>	<b>US teach.</b>
White	84.3%	77.9%		
Black	4.5%	13.1%	3.0%	7.2%
Native	<b>5.3%</b>	1.2%		<b>1.1%</b>
Asian & Pacific	3.4%	5.3%	1.0%	<b>1.4%</b>
Two Races	2.5%	2.4%		
Hispanic	<b>30.2%</b>	16.9%		<b>7.1%</b>
White, not Hispanic	57.1%	63.0%	79.0%	83.2%

# Demography (2012)

<b>Ethnicity</b>	<b>AZ</b>	<b>USA</b>	<b>AZ teach.</b>	<b>US teach.</b>	<b>ASU stud.</b>	<b>ASU teach.</b>
White	84.3%	77.9%				
Black	4.5%	13.1%	3.0%	7.2%	2.7%	2.1%
Native	<b>5.3%</b>	1.2%		<b>1.1%</b>	<b>1.6%</b>	<b>0.0%</b>
Asian & Pacific	3.4%	5.3%	1.0%	<b>1.4%</b>	4.3%	8.3%
Two Races	2.5%	2.4%				
Hispanic	<b>30.2%</b>	16.9%		<b>7.1%</b>	<b>10.3%</b>	<b>2.1%</b>
White, not Hispanic	57.1%	63.0%	79.0%	83.2%	66.0%	85.4%

# Problems

- Recruiting/supporting a more diverse teacher workforce
- How do our courses contribute to that?
- Importance of attention to social justice in overall preparation for teaching
- Interacting issues of curriculum, pedagogy, climate, and culture of our programs

# Teacher-Student Demographic Gap

- VT, ME, WV: 4%
- DC, MN, MD, KS: 21%
- MI, NE, AR, MA: 22%
- OK, RI, VA, FL, CO: 27%
- NM, GA, LA: 29%
- AZ: 34%
- IL: 35%
- NV: 41%
- CA: 43%

# Additional Inequities

- >20 states with  $\geq 25\%$  difference between the diversity of teachers and students
- 27% of African-American & 25% of Hispanic teachers certified through alternative routes
- 11 % of white teachers alternatively certified
- 37 % of African-American & 46 % of Hispanic teachers satisfied with their pay
- 52 % of white teachers are satisfied

# Enrollment and Social Role of Schools

- 1880: high schools = preparatory academies
- 1910: core of common school system
- 1890: 200,000 students (0.3% of population)
- 1910: 1,000,000 (1.1% of population)
- 1920: almost 2,000,000 (1.9% of population)
- 2013: 50,100,000 (15.8% of population)
- 1890: 7% of 14-to-17-year-olds enrolled
- 1920: 32% enrolled



- Achieving equity in mathematics education is a fundamental challenge facing mathematics educators (NCTM, 2000)
- Mathematics education imperative:
  - Providing students with mathematics deemed necessary for success in the current system
  - Providing opportunity to use mathematics to expose and confront obstacles to their success

# ASU Vision

To establish ASU as the model for a New American University, **measured not by who we exclude, but rather by who we include and how they succeed**; pursuing research and discovery that benefits the public good; assuming major responsibility for the economic, social, and cultural vitality and health and well-being of the community.

# Recruitment Strategies for Faculty Diversity

- **Identify top 5-10 women and minorities publishing in your discipline.**
- **Review programs for premier conferences in your discipline and those of disciplinary minority organizations.**
- **Contact top 10 departments in the nation and collaborate to identify:**
  - **Recent and soon-to-be PhDs and post-docs (as potential new assistant professor hires).**
  - **Senior scholars (as potential speakers or visiting scholars & then begin to recruit them when they visit)**
- **From the above efforts, generate a list of 10-15 diverse candidates for potential hire on tenure track.**

# Advertising outlets that reflect diverse constituents

- **General: Diverse Issues in Higher Education (formerly Black Issues in Higher Education)**
- **Native American:**  
Tribal College Journal of American Indian Higher Education  
Native Peoples Magazine (although not directly aimed at a scholarly audience, a lot of Native faculty subscribe)  
Indian Country Today (same as above, international in scope)  
Scholarly journals that include ads: Studies in American Indian Literature, American Indian Culture and Research Journal, American Indian Quarterly, and Wicazo Sa Review.
- **Hispanic:**  
Hispanic Outlook  
American Association of Hispanics in Higher Education

# Advertising outlets that reflect diverse constituents (cont'd)

- **African American:**

**Journal of Blacks in Higher Education**

**African American Review**

**Meridians**

- **listservs (low cost) that reach out to diverse populations:**

**Sisters of the Academy:**

<http://www.sistersoftheacademy.org/index.htm>

**Mujeres Activas en Letras y Cambio Social (for Latinas and indigenous women):**

<http://lists.malcs.net/listinfo.cgi/public-malcs.net>

# Result

Ethnicity	ASU math teachers
White	
Black	2.1%
Native	<b>0.0%</b>
Asian & Pacific	8.3%
Two Races	
Hispanic	<b>2.1%</b>
White, not Hispanic	85.4%

Not good...

# Student Recruitment

- Joint with Teachers College (MLFTC) in partnered high schools
- Our calculus students with information and real-life cases
- SACNAS and other conferences

# Courses with Student Awareness of MTSJ

- [Inclusion Practices at the Secondary Level](#)

Application of curricular trends and practices with students exhibiting special needs for accessing content in middle school or secondary general education settings

- [Instruction and Management in the Inclusive Classroom](#)

Basis of instructional strategies & techniques that facilitate learning for all learners. Special emphasis on lesson plan design including components of direct instruction and cooperative learning. Classroom design, management, and discipline theories are explored and practiced. **All lesson plans and classroom management designs address need to differentiate instruction for a variety of learners.**



# Induction Support

- US Department of Education \$11.5M “Planting the SEED Project.” MLFTC partnered with 23 school districts: PD in CCSS-M/STEM and induction support to math teachers in first year of teaching.
- Goal: improving emotional regulation ability of first-year teachers.
- Site coordinators meet with each graduate teaching in the partner district to
  - (1) review the MSCEIT (Emotional Intelligence test) results and
  - (2) provide coaching and support using the Six Seconds model.
- Support includes differentiated workshops once a month addressing each of the EQ competencies, with follow-up individualized coaching/support.

- Multi-Contextual Model for Diverse Learning Environments (Hurtado et al., 2012): students' multiple social identities are center of curricular and cocurricular spheres; they exist in dynamic relationship with faculty and staff identities through practices involving both content (or educational programming) and process (pedagogies and forms of practice).
- Higher Education Research Institute (HERI) devised Diverse Learning Environments (DLE) survey: provides a way to collect information about campus diversity and its relationship to student learning and success for institutions seeking to learn more about faculty identity, values, and behaviors.

# Tonya Bartell (2011)

- Study of eight secondary mathematics teachers who participated in a graduate course that engaged them in a version of “lesson study” to create, implement, observe, revise, and reteach math lessons that incorporated social justice goals.
- Looks at how teachers’ conversations about teaching mathematics for social justice changed over time and examines these ideas in practice

Table 2  
*Primary Codes That Drove Data Analysis*

Framing code	Focused code	Explanation
Teachers' conceptions of TMSJ*	Cultural difference	TMSJ* means relating mathematics to all cultures so all students can be involved.
	Student awareness	TMSJ means developing students' awareness of issues.
	Action	TMSJ means motivating students to take action to make change.
	Racism	TMSJ means dealing with issues of racism in the classroom.
	Opening gates	TMSJ means preparing students to pass through the gates of standardized tests (e.g. SAT, ACT) and college entrance.
	Using mathematics	TMSJ means using mathematics in society, both in terms of general math applications and using math to confront inequity.
Teachers' perceptions of social justice in relation to their students	Anticipating student responses	Teachers' anticipated student responses to TMSJ.
	Learning from student responses	Teachers' comments and/or adjustments to the lesson after learning from student responses.
Challenges teachers faced in TMSJ	Knowledge of social issues	One challenge faced is developing knowledge of social issues.
	Knowledge of pedagogy	One challenge faced is acquiring knowledge of pedagogy.
	Knowledge of students	One challenge faced is developing knowledge of students' experiences and interests.
	Knowledge of self	One challenge faced is dealing with the implications of discussion of social justice on one's personal life.
Teachers' conversations around the relationship between the math goals and social justice goals	Existing math curriculum	The math curriculum is already full and well-defined, we can't take anything out, yet it is important to connect TMSJ to this existing curriculum.
	Rigorous, legitimate math	It is important when teaching mathematics for social justice to have students engaging in rigorous, legitimate mathematics.
	Connects to students lives	It is important that TMSJ connect to students' lives (not just curriculum).

*Note.* \* TMSJ stands for teaching mathematics for social justice.

# Suggested Thinking Points

- “What does it mean to teach mathematics for social justice throughout a school year?”
- “What might this look like within and across multiple units, or within a single lesson?”
- “What would it mean to adequately contextualize this social issue over time?”

# Rochelle Gutiérrez (2009)

“PD for pre-service teachers should include explicit discussion about the fact that learning to teach mathematics for social justice is a complex, long-term process and adequate contextualization of social issues, for example, will not occur in the course of one professional development experience.”

# Revisiting Points Already Raised

- Engagement of mathematicians with math educators and teachers requires rethinking our role
- Colleges/universities are post-secondary schools where *we* are the teachers
- Irony: we were never trained to teach...
- Awareness is a good starting place
- Take responsibility

# Thank you for your attention!

- Recruit for and support **STEM**:
  - Science
    - Technology
    - Engineering
    - » Mathematics



## QUESTIONS?