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Scholar-Practitioners of Color Challenge Normative STEM-M Practices Through Cultural Intuition and Student Narratives/Voices

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Scholar-Practitioners of Color Challenge Normative STEM-M Practices Through Cultural Intuition and Student Narratives/Voices

ASHE 45th Annual Virtual Conference 2020

Friday, November 20, 2020

W. E. B. Du Bois Room

3:30 to 4:45pm CST

*This session will be audio recorded for internal purposes.
Please send us a message in the chat if you have questions.*

Presenters

Maria A. Reyes, MSE, MPA

Dean, Industry & Public Service -
Phoenix College

Janet Rocha, Ph.D.

Research Assistant Professor, Internal Medicine -
Feinberg School of Medicine, Northwestern University

Tamara Coronella, Ed.D.

Director, Student Success and Engagement -
Ira A. Fulton Schools of Engineering, Arizona State
University

Lindsay Romasanta, Ed.D.

Director, Student Success Programs
Student Retention and Success, University of
California San Diego

Session Outline

Session Objectives

Literature Review

Interactive Activity

Testimonios

Dialogue/Discussion

Closing Comments

Q & A

Session Objectives

- Challenge systemic barriers in diverse educational settings, such as deficit-frameworks and their associated normative practices
- Promote asset-based approaches and frameworks to achieve better equity, access, and opportunity for students of color in STEM-M pathways in K-16 settings
- Facilitate discussion with the audience on how they can replicate a similar approach of change at their respective institution

Introduction

This symposium features four scholar-practitioners of color working across the STEM-Medicine (STEM-M) pipeline who are actively engaging their cultural intuition (Delgado Bernal, 1998) to create access to higher education by challenging dominant pathways, practices, and cultures related to college readiness/preparedness, success, persistence, and the workforce transition.

STEM-M Statistics

- **STEM-M Major Attrition: URM students vs. White Students** (Riegle-Crumb, King, Irizarry 2019)
 - 37 % of Latinx students and 40 % of black students switched majors vs. 29 % of the white students
 - 20 % of Latinx and 26 % of black STEM majors left their institutions without earning a degree, vs. 13 percent of white STEM majors dropped out.
- **STEM-M Workforce**
 - The majority of STEM workers in the U.S. are white (69%), followed by Asians (13%), Blacks (9%) and Hispanics (7%) - Pew Research Center
 - 56 % of active physicians are white, followed by Asians (17%), Hispanics (6%), Blacks (5%) - Association of American Medical Colleges

STEM-M Context

Campus Climate defined: environment of college within and outside of the classroom (Yosso et al., 2009)

- Most often cited reason for student departure
- Hostile, unsupportive, exclusionary climate of STEM (Yosso et al., 2009)
- Stereotype threat

“the threat that others’ judgments or their own actions will negatively stereotype them in the domain” (Steel, 1997, p. 613)

Perceive they can succeed, they belong, they have the resources, and they will be accepted until...they begin to fear they will confirm stereotypes or begin to internalize those stereotypes

They begin to disidentify with STEM

Literature Review



Asset-based Approaches

- Working definition of assets: an innate capacity when activated serves as a powerful source of strength
- Key assumption regarding students then is that they have a multitude of strengths
- Most frequently discussed are social and cultural capital
 - Insufficient explanation because access to those capitals has been historically limited
 - Growing consideration of Community Cultural Wealth (Denton et al., 2020) in STEM-M context

(Yosso, 2005)

Deficit Thinking Model

Student failure is attributable to internal deficiencies (Valencia, 2010)

- Responsibility of the “family” to build social and cultural knowledge (Valencia, 2010, 2012; Yosso, 2005)
- *Blame the Victim* (Valencia, 2010)
- Concept of *educatability*
 - Perceived institutional responsibility to fill in gaps
- Outcomes: maintain subordination; reinforce dominant views of success

Critical Race Theory (CRT)

Critical Race Theory

- “identify, analyze, and transform those structural and cultural aspects of education that maintain subordinate and dominant racial positions” (Solórzano & Yosso, 2002, p. 5)
- 5 tenets: Centrality of race and racism (intersectionality), challenge to dominant ideology, commitment to social justice, centrality of lived experiences, historical context

Testimonios

- Centrality of voice, stories, histories
 - Our own
 - Our students
- Methodology to inform understanding of educational experiences through recognition and validation of historically marginalized voices and stories (Pérez Huber, 2009)
- The process of testimonio, is a form of validation
 - 'allows the individual to transform past experience and personal identity, creating a new present and enhancing the future' (Cienfuegos & Monelli, 1983, 46 as cited in Pérez Huber, 2009, p. 643)

Cultural Intuition (Delgado Bernal, 1998)

- Born from decades of Critical Race Feminist Scholarship (Anzaldúa, 1987; Collins, 1991; hooks, 1989; Hurtado, 1996; Walker, 1982)
- Draws on Chicana Feminist Epistemology as the underlying theoretical framework
- Extends on what Strauss and Corbin (1990) called "'theoretical sensitivity' - a personal quality of the researcher based on the attribute of having the ability to give meaning to data" (p. 563)

Cultural Intuition (Delgado Bernal, 1998)

Comes from four distinct areas:

- (1) personal experience (which are influenced by ancestral wisdom, community memory, and intuition);
- (2) existing literature (on and about Communities of Color);
- (3) professional experience;
- (4) the analytical research process

Cultural Intuition or “a sense of knowing”:

1. “Extends one's personal experience to include *collective experience and community memory*” (p. 563)
2. “A complex process that is experiential, intuitive, historical, personal, collective, and dynamic” (pp. 567-568)

STEM-related documents that cite Delgado Bernal's (1998) Cultural Intuition

Table 1. Documents Reviewed, 2010-2020 (N = 26)	
Graduate Theses and Dissertations	N
California State University, Fresno	1
Claremont Colleges	1
Loyola University Chicago	1
Michigan State University	2
Northern Illinois University	1
University of Alabama at Birmingham	1
University of California, Davis	1
University of California, Los Angeles	1
University of California, San Diego	1
University of North Carolina, Charlotte	1
University of North Carolina, Greensboro	1
University of Southern California	1
University of South Florida	2
Western University	1
Total	16
Peer-Reviewed Journals	
American Educational Research Journal	2
Education Sciences	1
Journal of Engineering Education	1
International Journal of Qualitative Studies in Education	1
Learning, Media and Technology.	1
NASPA Journal About Women in Higher Education	1
Review of Higher Education	1
School Science and Mathematics	1
Science Education	1
Total	10

Documents Reviewed 2010-2020

Total of 26 references

- 16 graduate theses/dissertations
- 10 peer-reviewed journals
 - Research context focus
 - Positionality
 - ***None are within a scholar-practitioner context***
 - Bridging theory into practice

In what ways have four scholar-practitioners of color engaged with their cultural intuition (Delgado Bernal, 1998) across the STEM-Medicine (STEM-M) pipeline?

**In what ways have four scholar-practitioners
of color engaged with their cultural intuition
(Delgado Bernal, 1998) across the
STEM-Medicine (STEM-M) pipeline?**

The stories we are told

Kasabihan

Dichos

Sayings



***Collect,
Collect &
then Select***

Charting our paths, grounded by our roots, to help us determine what forks in the road to take.

Self-Reflection

What is one saying that you remember that has stuck with you to this day?

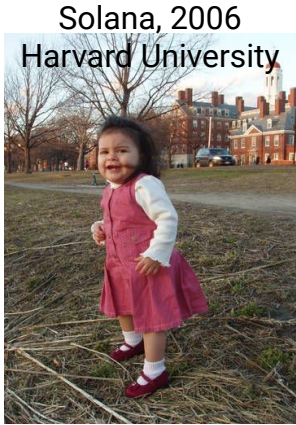
What was the root of the saying?

How has it helped you in your path today?

Four Testimonios

Take note of key words and your own feelings as you listen.

An Engineer – A Practitioner – A Developing or Imposter Scholar – Maria A. Reyes, MSE, MPA



More than
6000 participants
in 15 years

Pre-Conference
“I know what an
engineer or scientist
does” (35%)

“I CAN be an engineer
or scientist” (51%)

Before/After	(circle one)		Before Conference		After Conference	
	Yes	No	Yes	No	Yes	No
I would like to obtain a college education	Yes	No	Yes	No	Yes	No
There are situations that could stop me from reaching a college education	Yes	No	Yes	No	Yes	No
I have information on how I can overcome these situations	Yes	No	Yes	No	Yes	No
I know how to prepare for college. Classes to take during my high school years and who to go to for guidance.	Yes	No	Yes	No	Yes	No
I know what an engineer/scientist does	Yes	No	Yes	No	Yes	No
The career option of being an engineer or scientist is available to me.	Yes	No	Yes	No	Yes	No
I can be an engineer/scientist	Yes	No	Yes	No	Yes	No



Post-conference
responses at
93% and 91%
respectively

Latinas comprise ~ 2%
of those employed in
STEM (NSF/NCSES, 2015)

Yet they comprise > 16%
of the female population
(United States Census Bureau, 2016)

Latinas' eyes opened to engineering

By Kerry Fehr-Snyder
The Republic | azcentral.com

A select group of high-school students, many from Chandler, got a lesson Wednesday in not only the benefits of going to college but also the benefits of earning a degree in science, technology, engineering and math.

The students, about 200 in all, were part of a half-day conference for Hispanic women in science, technology, engineering and math at Chandler-Gilbert Community College.

"It's really about empowerment and understanding that education brings them opportunities," said Maria Harper-Marrack, provost of the Maricopa Community College District. "Eight of every 10 jobs will require a college education in the future."

Students started the day by participating in hands-on experiments, such as extracting genetic material from strawberries and making inexpensive models of the Mars rover Curiosity.

Using paper cups, plastic straws, a sandwich bag and marshmallows, students were told to work in teams to create replica rovers that could make a soft landing.

"I think we should make it like a parachute," said Lourdes Busceni, a junior at Westwood High School in Mesa.

At the end of the experiment, they discovered another team had an even better idea: filling their sandwich bag with air to cushion their rover's landing.

That was the take-home message for many students. By piecing together their ideas, they solved problems to find an engineering solution.

Problem-solving is among the benefits of engineering, according to Gabri-



Highland High School student Katie Grajeda drops the spacecraft her team built as CGCC physics faculty member Arlisa Richardson supervises. MARK HENLEY/REPUBLIC

TOP AREAS FOR STEM JOBS

Jobs in science, technology, engineering and math are expected to increase faster than non-STEM jobs. The top areas for STEM jobs, the number of those jobs and the percentage of all jobs in 2011 were:

- 1. District of Columbia: 72,143 (10 percent)
- 2. Washington: 238,417 (8 percent)
- 3. Virginia: 302,219 (8 percent)
- 4. Maryland: 202,100 (7.9 percent)
- 5. Massachusetts: 245,309 (7.1 percent)
- 6. Colorado: 167,347 (7.3 percent)
- 6. Delaware: 24,847 (6.1 percent)
- 8. Michigan: 231,148 (6 percent)
- 9. California: 895,461 (6 percent)
- 10. Minnesota: 157,681 (6 percent)
- 21. Arizona: 123,994 (5 percent)

Source: Economic Modeling Specialists Inc.

Workers employed in STEM fields earn more than those in other jobs. On an hourly basis, workers earned from \$32.26 to \$42.84, according to Economic Modeling Specialists Inc. Non-STEM jobs pay from \$9.30 to \$18.02, according to the economics research firm.

The salary is enough for Luz Osuna, a 24-year-old industrial engineer at Intel, to commute from Glendale to Chandler every day.

She volunteered at the Hermanas conference for several years. "I enjoy promoting STEM in under-represented groups," Osuna said. "A lot of times girls think there is only one kind of engineering, the one for boys."

Some students do not understand that biomedical engineering is a career



This program was designed with other Latina engineers with a foundation in our cultural intuition. The familial recognition of those that came before us, as Hermanas, was a nod to our collective efforts as practitioners and outreach to those that follow us.

CHANDLER NEWS 26 MIDWEEK • SEPTEMBER 26, 2012

Latina students urged to explore STEM careers

The Republic | azcentral.com

More than 200 Latina high-school stu...

"All too often, there is the perception that these professions are not considered traditional careers for Latinas."

Testimonios – The Practitioner becomes the Scholar

MCCCD Is Committed to Expanding Our IT Workforce

by Mike Hunter



“Principal Investigator, Maria Reyes expressed her excitement for this opportunity by saying, ‘We are eager to design this high-impact model that will build capacity to engage and retain Hispanic students throughout their higher education experience, as well as prepare them for STEM related positions in the workforce.’”

Testimonios – The Practitioner becomes the Scholar

Utilizing My Scholar-Practitioner Identity to Heal a Still-Painful Wound: Making the Invisible, Visible - Janet Rocha, Ph.D.

“Si Se Puede”/ "Yes, we can"



About Dr. Rocha:

Personal Background:

- Mexican-American/Chicana
- Child of immigrant Mexican parents
- Grand Daughter of a Bracero
- First-generation college graduate
- Low-income/limited resources
- Blessed with mentorship & guidance

Academic Background:

- Education/Training at Research I Institutions
- Research on URM in various fields

Professional Background:

- Theory in Practice
- Design, Implement, and Assess Programs in Student Affairs and Academic Affairs

Dr. Rocha's Cultural Intuition:

Incorporate my cultural intuition in research, practice, and teaching

Centralize student experiences and voices

Draw on asset-based frameworks:
Community Cultural Wealth (Yosso, 2005)
Pedagogies of the Home (Delgado Bernal, 2001)
Pedagogies of Sacrifices (Rocha, 2020)

Seek diverse collaborators to facilitate student empowerment

HSTEP - Strategic Alliance Partnership:

Academic Hospital, Medical School, & High School

HSTEP Participants:

- 92% are Black or Latinx students
- 81% are first-generation college students
- 66% are female students

My Role - Enhance the student experience through a culturally sustaining curriculum, high-impact practices, and evidence-based research.

Students' Subjective Experiences with HSTEP:

"Being able to **have a mentor**, I think, allows me to **see into the future** and see that **I can succeed**, and **what it takes to succeed**. And like having people that look like me, that **people who look like me have succeeded**, and that it **will take** a lot of **hard work**, but **it is possible**."

-Rising senior, Black male, 2016

"The program definitely **gave me more confidence** and that **helped me academically**. You can **see that in my G.P.A at school**. I feel that [HSTEP] **gave me more of a purpose**."

-Rising senior, Latina, 2018

Program Objectives:

Expose Youth to Health, Medicine, and Science Careers

Promote a "Culture of College"

Facilitate Mentorship Opportunities

Provide Professional and Leadership Development

Student Outcomes:

- Ignite STEM-Medicine Curiosity and Identities
- Achieve Personal, Academic and Professional Development
- Foster a Sense of Community and Support
- Facilitate Transformative Beliefs, Attitudes and Behaviors



Scholar-Practitioner - Health Science Teaching Excellence Program

An authentic approach to academic advising informed by cultural intuition – Tamara Coronella, Ed.D.



About me:

- Mother to 2 boys
- 3rd generation Arizonan
- First-generation parents from mining community, career educators
- Career educator - 20 years at Arizona State University
- Completed doctorate recently

Central force in my research:
Testimonios from my mother
and my colleague (later my
participants)



An authentic approach to academic advising informed by cultural intuition

Validating Advising Practices Defined: supportive, affirming, and empowering approach where students reflect upon and enlist their strengths and assets through advising interactions with a *validating agent*

- **Support** – state they believe in student, connect to resources, develop strengths (Barnett, 2006; Rendón & Muñoz, 2011)
- **Empower** – “active participatory process of gaining resources, competencies, and key forms of power necessary for gaining control over one’s life and accomplishing one’s goals” (Stanton-Salazar, 2011, p. 1090)
- **Affirm** – leveraging their strengths, assets, and lived experiences (Rendón & Muñoz, 2011) (see Yosso, 2005)

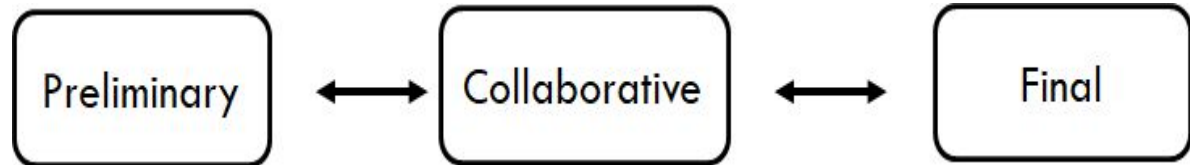
Qualitative, action research study

Critically raced-gendered epistemology

Three FSE advisors – first-generation - Audrey, Jennifer, and Elena (all pseudonyms)

From those three, recruited 10 students (3, 3, and 4)

Narrative interviews, focus groups, reflections



Three-phase data analysis process *adapted* (Pérez Huber, 2009)

An authentic approach to academic advising informed by cultural intuition

- *"I think especially with some engineering, especially computer science there might be guys that you see who have been doing it since they were little kids. And, so they know so much that it might seem like, 'Wow, they're on the same level. How am I ever going to catch up to them?'" (Emily, when analyzing data which discussed feeling out of place in engineering)*
- *"Looking back on it, I don't know if that was a good decision or not [to ask Emily about DACA]...maybe my other students that are in that position have tiptoed around it, but they haven't said this, because I think sometimes, they're afraid to" (Jennifer, advisor)*
- *"When you're meeting more than once and you're getting to know your advisor and you're getting that relationship with them, you feel more inclined to say, "Okay, these are my concerns. I don't think I can do this."...It's just nice as like a person to just have that" (Mona, describing her advisor, Elena)*

Components of authentic dialogue	Description of Advisor Approach to Dialogue		
	Audrey's Practices	Jennifer's Practices	Elena's Practices
<i>Build trust and understanding through shared stories</i>	Reluctantly elicited information	Experienced deeper understanding	Articulated appreciation
<i>Embraced ways of knowing and created new understanding</i>	Restrained herself from fully engaging	Considered her own positionality	Recognized influence of deeper connections
<i>Acted with solidarity by sharing responsibility to enact change</i>	Continued to employ legacy advising practices	Articulated a change was needed	Implemented practices broadly

Validating Advising Practices Defined: supportive, affirming, and empowering approach where students reflect upon and enlist their strengths and assets through advising interactions with a *validating agent* (see Stanton Salazar, 2011)

Photo-Testimonios which illuminate (missed) opportunities for student success – Lindsay Romasanta, Ed.D.

About Me

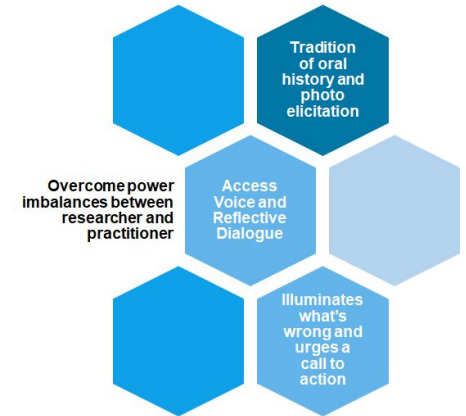
- First-Generation, Low-Income College Grad
- Immigrant Family
- Single Parent Household
- 10+ years experience in student services and retention of underserved student populations
- Asset-based Scholar Practitioner

Cultural Intuition as a revelation to challenging the dominant narrative

Personal Experience | Professional Experience
Literature | Analytical Research Experience



Photo Testimonios



(Romasanta & Liou, 2018)

Centering Student Voices and Visions in Student Success Efforts

Sacrifice



When it gets tough, I think about my parents, especially my dad. My dad worked so hard throughout his life since he was four, being a slave to the ranch life, to now, he busts his back working outside in the blazing sun. I've never heard my dad complain. I know that what I am going through would never compare to what my dad has been through.

Paying it Forward



If we can support each other, and show each other that "No. All these other people did it. We're doing this. You can do it, too."

On a micro level, it's going to start by helping ourselves and our community which will eventually become something bigger at a macro level. Not just helping our university, but expanding to different states, and universities, and countries.

That's why I think it starts with us.

Centering Student Voices and Visions in Student Success Efforts

Familial Capital



This is a blanket I have on my bed. It reminds me of my family and that I am never alone.



Hummingbirds represent my family in Mexico, my heritage, and my drive to have a better life and to give them a better life. This keeps me going.

Acknowledgement of college opportunity



While this is a blessing it helps me to remember how privileged I am and how I cannot give up on my dreams.. Dreams that I never thought would come true.



I am motivated by knowing I was lucky enough to make it to 'El Norte' and to make it back home to 'Merica.

Reflection and Discussion

Breakout rooms overview

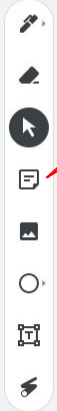
Reflection: Please visit: <http://bit.ly/ashe1120fri> and enter your reflections on the jamboard.

What major themes emerged?

Using a "sticky note" (on the left-hand side menu), write your reflection.

What connections do you see within your own story?

Jamboard
Tools



Sticky Note

Discussion

Examination –
how do our roles as
scholar-practitioners
influence student
empowerment in our
respective settings and how
do we value students’
narratives/voices for social
change at all educational
levels and settings?

1. What are the major challenges we encounter in our work when challenging normative STEM-M practices at our respective institutions, and how are we navigating such experiences?
2. What are other potential strategies higher education can promote to achieve transformative experiences among marginalized students in STEM-M pathways?

Closing Comments/ Conclusion

Charles Lu, Ph.D.

Director, Office of Academic Support & Instructional
Services - UC San Diego

Questions

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