Learning from HSIs and Institutions Adopting Inclusive Science and Transformation Practices
Sylvia Hurtado, UCLA
HSIs enroll...

- A greater share of Black students in the U.S. than Historically Black Colleges and Universities (HBCUs) (16% compared to 10%) (Hurtado & Alvarado, 2015)

- Higher share of Native American students than Tribal Colleges and Universities (TCUs) (14% compared to 11%) (Hurtado & Alvarado, 2015)

Purpose

Cross-case analysis of 11 institutions that are exemplary in graduating URM students with STEM degrees to identify strategies unique for HSIs
### Framework

#### HSI Organizational ID
(Garcia, 2013)

1. regionally focused
2. committed to the surrounding community
3. dedicated to access
4. committed to serving a diverse population

#### Typology of Institutional Diversity
*Núñez, Crisp, and Elizondo (2016)*

1. Urban Enclave CC
2. Rural Dispersed CC
3. Big Systems Four-Year
4. Small Communities Four-Year
5. Puerto Rican Institution
6. Health Science School

#### HSI Typology of Organizational ID
Garcia (2018)

- Latinx-enrolling
- Latinx-producing
- Latinx-enhancing
- Latinx-serving
Methods
<table>
<thead>
<tr>
<th>Institutional Pseudonym</th>
<th>Control</th>
<th>MSI Status</th>
<th>Classification</th>
<th>STEM Bachelor's Degree Efficiency Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southeast State University</td>
<td>Public</td>
<td>HSI</td>
<td>Doctoral Universities: Highest Research Activity</td>
<td>.82 Latinx, .53 Black, .35 American Indian</td>
</tr>
<tr>
<td>West Coast State University</td>
<td>Public</td>
<td>HSI</td>
<td>Master's Colleges &amp; Universities: Larger Programs</td>
<td>.83 Latinx, .37 American Indian, .27 Black</td>
</tr>
<tr>
<td>East Coast State University</td>
<td>Public</td>
<td>HSI</td>
<td>Doctoral Universities: Higher Research Activity</td>
<td>.81 All STEM</td>
</tr>
<tr>
<td>Southern Private University</td>
<td>Private</td>
<td>HSI</td>
<td>Master's Colleges &amp; Universities: Larger Programs</td>
<td>.65 Latinx, .35 American Indian, .12 Black</td>
</tr>
<tr>
<td>Central Plains University</td>
<td>Public</td>
<td>N/A**</td>
<td>Doctoral Universities: Higher Research Activity</td>
<td>.96 American Indian, .44 Latinx, .35 Black</td>
</tr>
<tr>
<td>Northern Mountain University</td>
<td>Public</td>
<td>N/A**</td>
<td>Doctoral Universities: Higher Research Activity</td>
<td>.94 American Indian, .75 Latinx, .25 Black</td>
</tr>
<tr>
<td>Atlantic Southern University</td>
<td>Public</td>
<td>HBCU</td>
<td>Master's Colleges &amp; Universities: Medium Programs</td>
<td>.89 American Indian, .84 Black, .52 Latinx</td>
</tr>
<tr>
<td>Mid-Atlantic University</td>
<td>Private</td>
<td>HBCU</td>
<td>Doctoral Universities: Higher Research Activity</td>
<td>.81 All STEM</td>
</tr>
<tr>
<td>Western Private College</td>
<td>Private</td>
<td>N/A</td>
<td>Baccalaureate Colleges: Arts &amp; Sciences Focus</td>
<td>.73 All STEM</td>
</tr>
<tr>
<td>University of the Southeast</td>
<td>Public</td>
<td>N/A</td>
<td>Doctoral Universities: Highest Research Activity</td>
<td>.79 All STEM</td>
</tr>
<tr>
<td>Midwest State University</td>
<td>Public</td>
<td>N/A</td>
<td>Doctoral Universities: Highest Research Activity</td>
<td>.75 All STEM</td>
</tr>
</tbody>
</table>
Stochastic Frontier Analysis → efficiency scores → Selection of 11 diverse institutions with high efficiency scores → web scraping → 15-25 interviews per site visit (faculty, senior administrators, STEM program directors) → wrote institutional reports → Coded transcripts: open coding, axial coding, team inter-rater reliability 85% → Cross-case analysis: constant comparison using matrices, institutional reports, codes, team discussions until themes from HSIs became salient

<table>
<thead>
<tr>
<th>HSI Name</th>
<th>Southeast State University</th>
<th>East Coast State University</th>
<th>West Coast State University</th>
<th>Southern Private University</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carnegie Classification</strong></td>
<td>Public R1</td>
<td>Public R2</td>
<td>Public Master’s</td>
<td>Private Master’s</td>
</tr>
<tr>
<td><strong>Undergraduate Enrollment</strong></td>
<td>41,038</td>
<td>8,170</td>
<td>22,157</td>
<td>4,620</td>
</tr>
<tr>
<td><strong>Latinx Enrollment %</strong></td>
<td>67%</td>
<td>27%</td>
<td>42%</td>
<td>41%</td>
</tr>
<tr>
<td><strong>Admittance Rate %</strong></td>
<td>50%</td>
<td>65%</td>
<td>39%</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Institutional Diversity Typology</strong></td>
<td>Big Systems Four-Year</td>
<td>Big Systems Four-Year</td>
<td>Big Systems Four-Year</td>
<td>Small Communities Four-Year</td>
</tr>
</tbody>
</table>
UNIQUE CHARACTERISTICS OF HISPANIC SERVING INSTITUTIONS

- Knowing and Serving Students Well
- Being Receptive to Learning and Improving
- Outreach and Service to the Surrounding Community
- Hiring Diverse Faculty who Care About Teaching
“They care about you as a student, as a person who is also a student. I’ve had teachers tell me that they’ve bought books for students. I often see people put themselves out for students—I think that’s everyone here, in general, for the most part.. The students here, you treat them like your kids.”

Faculty, agriculture department, East Coast State University
“If you’re a faculty member in Southeast State University you have extensive experience working with underrepresented minorities because that’s our student body. And I would say – I don’t know if it’s the majority but certainly approaching a majority of our faculty members are themselves very diverse in terms of their ethnicity or race. And then we have African Americans, Indians, Hispanics, Asians, I mean our faculty is probably almost as diverse as our student body but not quite.”

Program administrator, Southeast State University

“We consider ourselves...not being solely in (city), but of (city). That means that our linkages and our partners, and when we’re thinking about building educational experiences, we’re not solely thinking about building them for our graduate or undergraduate students. We’re also looking at enhancing a pipeline of students and opportunities.”

Senior administrator, East Coast State University
How Campuses Do More with Less: Leveraging Resources for STEM Transformation and Graduating Underrepresented Racial Minorities with STEM Bachelor’s Degrees
Background and Purpose

- Context of diminishing state resources for higher education
- Much will depend on whether institutions can be more attentive to student-centered learning, make strategic use of resources to reform undergraduate education in STEM, and institutionalize or scale-up innovations (Malcom & Feder, 2016)

Purpose

Determine how institutions leverage their resources to improve teaching and learning that contribute to STEM degree attainments.

What lessons can we learn about strategies for change?
Macro-Framework – Multiple Theories for Change

Context for Change
- Institution type
- STEM disciplines
- Faculty in specific departments

Approach to Change
- Evolutionary
- Cultural
- Organizational Learning
- Political
- Scientific management

Agency/Leadership
- Top down
- Grassroots, faculty and staff
- Shared leadership

Institutions Leverage Human, Financial and Network Resources

Adapted from Kezar (2014), How Colleges Change.

Strategies Combine to focus approach
Methods

Stochastic Frontier Analysis $\rightarrow$ efficiency scores $\rightarrow$ Selection of 11 diverse institutions with high efficiency scores $\rightarrow$ web scraping $\rightarrow$ 15-25 interviews per site (faculty, senior administrators, STEM program directors $\rightarrow$ wrote case study reports $\rightarrow$ Coded transcripts: open coding, axial coding, team inter-rater reliability 85% $\rightarrow$ cross-case analyses using matrices, institutional reports, codes, team discussions until themes became salient

Multiple Case Study Design
Five Themes

Extending Institutional Funds: Commitment and Catalyst Funding

Students as Resources: Training Students to Support Other Students

Faculty and Student-Centered Investments

New Physical Spaces and Program Structures

Powerful Partnerships with Organizations and Institutions
Squeezing money [from limited institutional resources] can sometimes be a little bit more difficult. But, if you have a plan to leverage resources so that you can say that you can bring this in, in exchange for these other things being put on the table, then resources are usually made available at that point.

- Biology Faculty, Northern Mountain University
You have a certain responsibility to the students that you enroll that your concern ought to be what is in their best interest, not what is the least amount of money you can spend on students who could tutor each other. How do you identify those students, and what is the mechanism that would allow you to connect those students with other students who need the support? The students who need the support would get a general benefit from it, but it’s also helpful for the students who are providing support because they feel a sense of commitment to the organization. -Director of the Learning Center, East Coast State University
I think the former administration put a very high value on students, and so our former dean that had one litmus test, which I think you’ll like the litmus test for making decisions, “put the needs of the students first.” That was above research. That was above everything else. Puts the needs of the students first. I tell students ‘You’re our junior colleagues. You’re our emerging colleagues. We wanna treat you like that. We’re so happy you’re here.’

–Biology Faculty member, Midwest State University
Institutional Approach: Aligning external interests in support

[A major research university] is right next to us, and there is a mutual benefit between us and them, because they would like to train minority students and we would like [our] minority students to go to an active lab because there are so many R1 research grants that will support them, but we will support them in terms of supplies and money [in the program here].”

-Neuroscience Faculty, Atlantic Southern University
We actually have a ...really strong [consortium] math community... We work really hard—I think we’re one of the few disciplines on campus that meet every year... we meet in January every year to talk about what courses we’re going to be teaching the next year and the algebraists will get together and say who’s going to teach what and which semester, and let’s not overlap. The statisticians will get together and same thing...We have a colloquium every Wednesday that is very much all of us working together. In fact, usually the colloquium chairs will be from two different institutions...as well as seminars throughout. There’ll be a topology seminar, applied math seminar that, again, because we only have two applied mathematicians at (Western Private), but there are other other applied mathematicians in other areas.

-- Math Department Chair, Western Private College
New Physical Spaces and Program Structures

Basically, that room had not been used for a couple of years... Last year, at some point, I started asking around, “What is this room for? Who uses this room,” and no one could tell me... Then those big piles of dirt across the street are where there used to be a building that had a lot of chalkboards and whiteboards, and so right before it was demolished, we grabbed those and used them to line the walls that didn’t already have boards on them in this building...Through some creative furniture moves and rearrangements... we were able to give three of the rooms in this building moveable tables instead of their bolted together tables...The faculty who are teaching the intro science courses just hold some of their office hours in there and they’ve got a schedule worked out...That way there’s somebody with some expert knowledge who can help, but then it’s also a place where students can just come and hopefully run into other students in the same course. --Associate Dean, Southern Private University
New Physical Spaces and Program Structures (cont).

Hubs and Co-located Services

The biggest source of out of the classroom support, for STEM in particular, would be our Student Success Center. So we have a one stop student success center: supplemental instruction is in there, tutoring is in there, quantitative skills center, writing center, reading center and then all of the advisors. And so, in this one building, you will be able to access all kind of people. So if you come in there and you are in supplemental instruction, but you want to talk to them about “Well how do I get into research?” you can go right over to career services and they can get you connected. So, that’s been a big investment over the last couple of years, is to co-locate these things so that students are not running around campus trying to find out where the resources are because they’re pretty much centered in one place. --Provost, Western Private College
Conclusion & Lessons Learned

• Institutional constraints mentioned at all 11 institutions—may be due to study methodology, selecting efficient institutions in STEM degrees

• Determine how faculty and staff labor is incentivized and rewarded, and how institutional leaders can be equitable in how they distribute funds to reward change agents and support successful STEM teaching and learning innovations

• Further research on mid-level administrators in the future as a unique College-based approach suggests that resources are centered there and the agency of these leaders are critical to improving teaching and learning

• Important to identify institutions, who with a little more funding (external or internal), will make significant improvements in URM STEM degree attainments.
Characterizing the DPC Approach

- A collaborative, consortia of educators and researchers for innovation and best practices
- Interdisciplinary fields influencing health science research
- Training All Career Stages—systemic approach beginning at the undergraduate level
- Funding Institutions instead of interventions
- Systemic approach—involving partner institutions for pipeline programs and placement of students in research institutions that position them for graduate study
An Institutional Approach Involves

- **Redistribution of resources**—putting resources in institutions with high URM, low-income, first generation students to enhance research capacity
- **Requires development at three levels**—faculty coaching, student training, and institutional capacity building
- **Commitment** at multiple levels—central administration, Deans, Department Chairs, faculty
- **Intentionality** to reform efforts to overcome normative practices that have sustained the reproduction of disparities (e.g. mentoring those who look like current scientists)
Institutional Practices: Convergence of Commitment to Diversity and Science Training

- Participation of Diverse Researchers
- Diversity Innovations in Science
- Climate for diversity
- Connections with Diverse Communities
- Culturally Responsive Practice
- Integrated race/gender and science identities

Inclusive Science

Training

Partnerships

Curriculum

Program Activities
Contact Us

Faculty/Co-PIs:
Sylvia Hurtado
Kevin Eagan

Administrative Staff:
Dominique Harrison

Graduate Research Assistants:
Hector Ramos
Ana Gomez
Damani White-Lewis
Krystle Cobian

Papers and reports are available for download from project website:
http://heri.ucla.edu/nih (presentations)