Transitioning Learners to Calculus in Community Colleges

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Transparency in Dimensions of Success in Minority Serving Community Colleges

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Research Session

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HIGHLINE COLLEGE

Research Space

- Need to diversify science, technology, engineering, and mathematics (STEM) fields
- Community colleges as sites to invest in the preparation of a diverse STEM force
- Multiple, coordinated efforts required… No magic pill!

However…

- Low ”success” rates for underrepresented minority students (URM) (e.g., program completion, transfer) traced back to low mathematics performance through the math courses sequence

- Discomfort in the field addressing or acknowledging mathematics learning as a racialized experience

(Bailey & Morest, 2006; Battey et al., 2016; Crisp & Nora, 2009; PCAST, 2012)

TLC3 Overview

- What contributes to successful transition of URM students through the STEM math pathway?

Asset approach:

- What can we learn from institutions that are successful transitioning URM students through the STEM math pathway, from developmental math to calculus 2?

- How can our institutional self-assessment tool help colleges determine how they are doing in supporting URM student transitions?

(Burn, Mesa, Wood, Zamani-Gallaher, 2016)

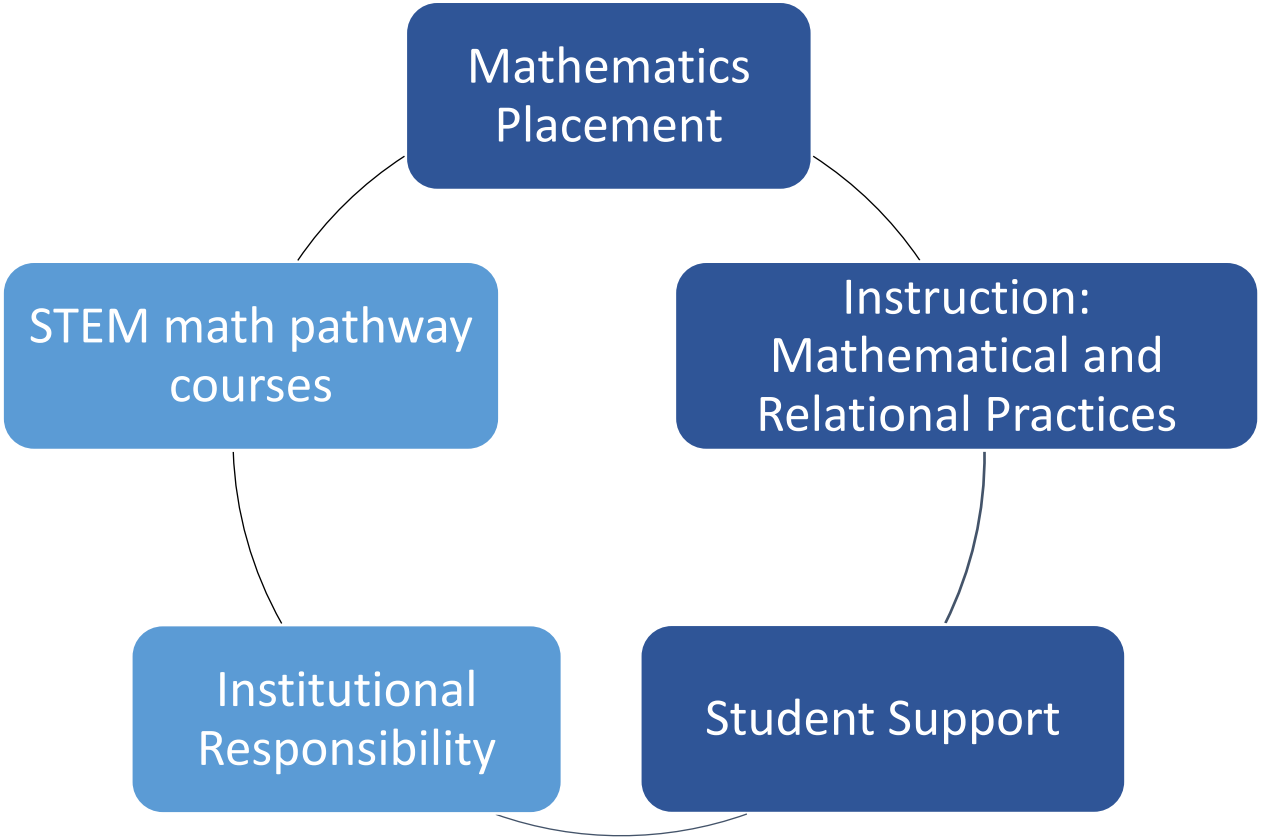
Methods

- Developed initial set of hypothesized dimensions based on prior research (e.g., *National Study of Calculus*, Wood et al.'s (2015) *Teaching Men of Color in Community Colleges*)
- Conducted TLC3 National Survey (2016-17) and case studies math programs in of four Minority-Serving Institutions (2018-19) to flesh out indicators for each dimension

Three rounds of revision of dimensions and indicators

- After National Survey (Nov 2017)
- After case studies completed (Nov 2018)
- After case study data analysis (September 2019)

Current TLC3 dimensions supporting successful transitions (see handout)



How can colleges determine how they are doing in supporting URM student transitions?

Some assumptions:

- Colleges are complex organizations
- Context influences how the colleges propose and enact policies
- Mathematics is not really a "neutral" subject
- At the core colleges are committed to students' success
- There is always a way to do things better

→ How can this be conveyed to institutions?

Transparency, Part I

The degree to which the college clearly and honestly communicates its **actions**, **decisions**, and **values** with and to college members (institutional agents)

Values: what the college deems important for supporting students (who, how, and why)

Institutional Agent: a person with authority within the college who acts to directly distribute, or negotiate the distribution of, highly valued resources to the student

Transparency, Part II

It needs…

- **shared understanding** among institutional agents of their actions, decisions, and values regarding programs and strategies that support student transitions
- **being promoted** through easily accessible venues (syllabi, fliers, posters, webpages) that convey accurate information and reach students and the college community
- **student awareness** of the practice/policy/program and perception that students truly matter to the college

Case Study Visits

- Four community colleges that serve students who are underrepresented in STEM fields
  - College 1: West coast with a large Southeast Asian student population, including Hmong
  - College 2: West coast, majority Latinx students (HSI)
  - College 3: Midwest, majority African American students (PBI)
  - College 4: Southwest, serving Native American students only from multiple nations, clans, bands, and tribes (TC)
- All doing important work in supporting their students' transitions, all identified the student subgroup as important

Data available

- Interviews with staff (*n*=10) and faculty (*n*=21)
- Focus groups (*n*=5) with 44 students across the four sites
- Classroom observations (*n*=26; 715 students)
- Students tests (*n*=200, TC only)

Analytical strategy

- Identify evidence that speak about the indicators for each dimension within each case
- Assess transparency of an indicator
  - Is the information the same across participants (Yes, No, Unable to confirm)
  - Is the information promoted? (Yes, No, Unable to confirm)
  - Are students aware? (Yes, No, Unable to confirm)
- Develop a master indicator spreadsheet populated with evidence

The AANAPISI Case

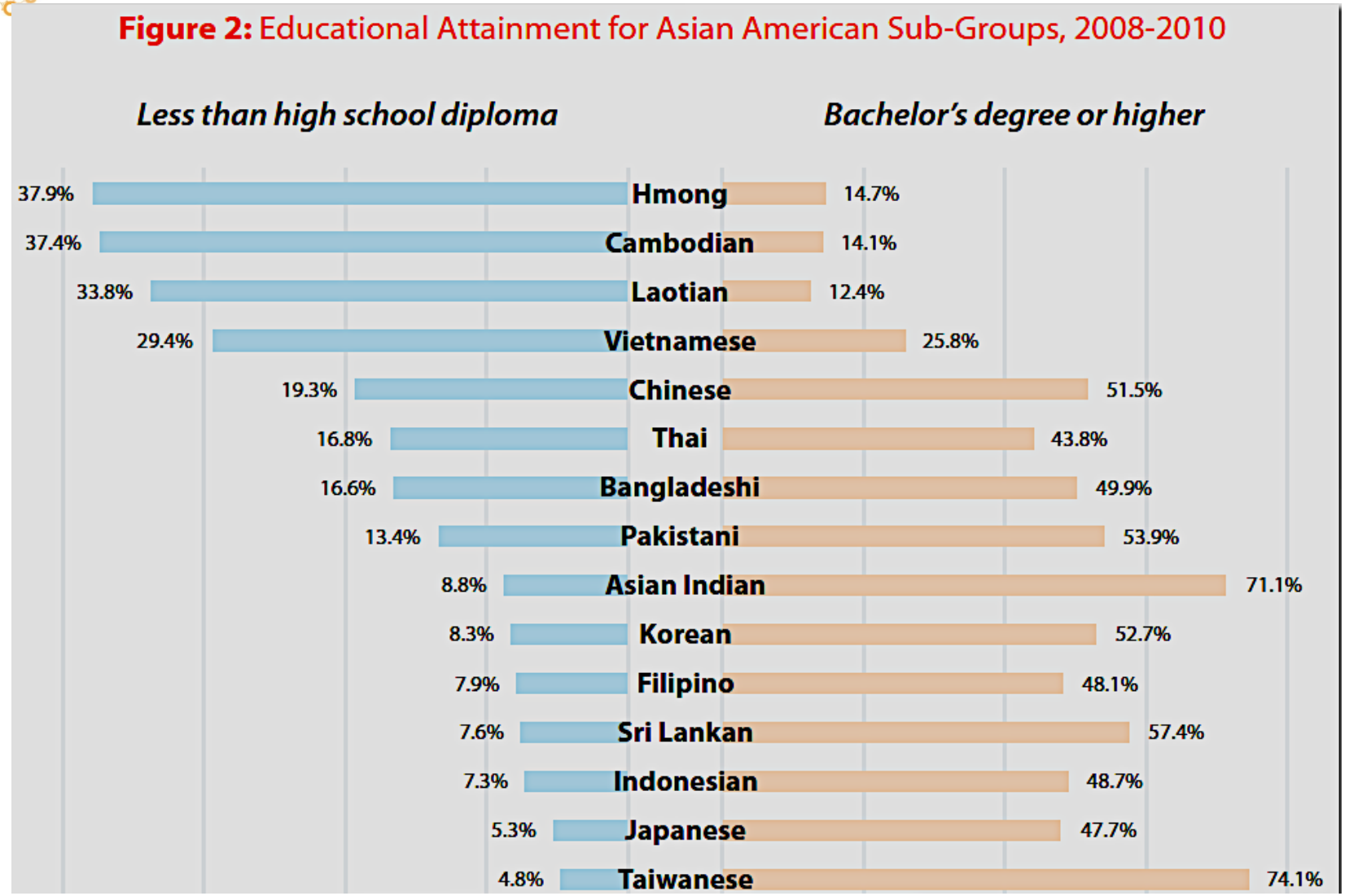
Asian **A**merican, **N**ative **A**merican, and **P**acific **I**slander Serving Institution
(based on 10% or more enrollment)

Case study: High Southeast Asian student population, including Hmong

AANAPISI Challenges

- Model Minority Myth:
  - Ascribed intelligence/natural ability in math
  - Can negatively impact student help-seeking behavior
  - Insidious in using Asian Americans as evidence of the "American dream" and in not calling out underperformance of white students
- AANAPISI students can be invisible, including in the data

Figure 2: Educational Attainment for Asian American Sub-Groups, 2008-2010



Student Support

Current grade and standing is available to students throughout the term

Space is available on campus for students to gather and work together on mathematics

Math tutoring and instructor office hours are available and accessible to students

Relevant support services (e.g., tutoring, disability services, transfer advising, wellness center) are highlighted in syllabi and during instruction

Student Support - AANAPISI

	Shared Understanding	Promoted	Student Awareness
Current grade or standing always available	Yes	Yes	Yes
Space on campus to work	Yes	Yes	Yes
Access to tutoring and office hours			
Faculty highlight supports			

There was strong alignment between faculty, administrator, and students about the high-quality support provided to students through the campus tutorial center and the open space (sometimes referred to as the computer pit) as an optimal space for students to work.

Relational Practices

Authentic care and welcomeness to engage are expressed to students

Performance monitoring techniques are used consistently (e.g., feedback on learning, reminders about deadlines, etc.)

Student questions and concerns are validated and addressed

What students find helpful or hindering in their college experience and math courses is well-known and understood by mathematics faculty

Relational Practices

- Awareness of SEA student subgroups
- Generally believed to do well
- 3 faculty had "rising tides lift all ships" approaches
- 2 faculty who grew up in the area had significant knowledge of SEA culture and practices to consider in helping students succeed.

Authentic care and welcomeness			
Performance monitoring			
Validation of student questions		N/A	No
Knowledge of student needs	No	N/A	No

The Tribal College Case

Tribal College

- About 500 students enrolled
- 100% are Native American or Alaskan Native; over 76 different nations are represented
- Residential campus (~87% of students are full time)
- Relative older population (~40% 25 years and older)
- Small STEM cohorts (~24 certificates or associate's degrees awarded)
- Retention rate for first time, degree seeking full-time students is about ~46%
- Mathematics faculty are not Native American

Placement

1. Multiple measures are used for placement, including high school transcripts
2. Advising about the placement process and results is available to students
3. Placement policies ensure highest possible placement (e.g., retesting, offering brush-options, adjusting after term begins

Placement

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ACT, ACCUPLACER, and sometimes High School GPA.
Hesitance about GPA because of inconsistency across high schools

Placement

1. Multiple measures are used for placement, including high school transcripts
2. Advising about the placement process and results is available to students
3. Placement policies [illegible] highest possible placement (e.g. [illegible] adjusting after [illegible]

Many supports: in situ as students take tests; invitations to visit tutoring lab and college coaching services; explanation of mailings

Placement

1. Multiple mea
   including high
2. Advising abou
   is available to stude
3. Placement policies ensure highest possible placement (e.g., retesting, offering brush-options, adjusting after term begins

Challenge placement; test retake; free placement test at the beginning of the term; student decides; faculty can challenge and if disagreement then contract for regular tutoring is set

Mathematics Placement

	Shared Understanding	Promoted	Student Awareness
Multiple measures	Yes	Unable to confirm	Yes
Advising results are known	Unable to confirm	No	Yes
Ensure highest placement	Unable to confirm	No	Yes

Relational Practices

1. Authentic care and welcomeness to engage are explicitly expressed to students
2. Performance monitoring techniques are used consistently (e.g., feedback on learning, reminders about deadlines, etc.)
3. Student questions and concerns are validated and addressed
4. What students find helpful or hindering in their college experience and math courses is well-known and understood by mathematics faculty

Relational Practices

	Shared Understanding	Promoted	Student Awareness
Authentic care and welcomeness	Yes	N/A	Unable to Confirm
Performance monitoring	Yes	N/A	Unable to Confirm
Validation of student questions	Yes	N/A	No
Knowledge of students	No	N/A	No

Relational Practices

	Shared Understanding	Promoted	Student Awareness
Authentic care and welcomeness			Unable to
Performance monitoring			
Validation of student questions			
Knowledge of students			

Majority of faculty were welcoming; instances signaling preferential treatment towards male than female students. Students did not discuss whether they found faculty welcoming or not.

Relational Practices

	Shared Understanding	Promoted	Student Awareness
Authentic care and welcomeness			
Performance monitoring			
Validation of student questions			
Knowledge of student needs	No	N/A	No

One instructor interviewed thought he knew what works with Native American students; another admitted the classroom materials do not reflect Native American identities

Relational Practices

	Shared Understanding	Promoted	Student Awareness
Authentic care and welcomeness			
Performance monitoring			
Validation of student questions			
Knowledge of students	No	N/A	No

Students in the focus groups noted that some faculty make an effort to connect math to personal lives, yet were frustrated with their teaching techniques

Discussion, 1

- The dimensions appear to be sufficient to describe key aspects of the work colleges do to support students in their transition
- The indicators help to illustrate a range of practices, strategies, and programs some of which are clearly tied to the college's missions and values
- The assessment of the evidence gathered regarding transparency can provide a starting point for collegial and campus discussions to promote practices that support URM students

Discussion, 2

- The self-assessment tool needs to be easy to use by institutional agents
  - It is not intended to be prescriptive!
  - If there is shared understanding about a practice (e.g. using a particular textbook), if it is promoted, and students are aware of it then it is transparent. Is that a problem?
- Not all dimensions are created equal. Gathering evidence for some areas requires training
- Synthesizing across dimensions requires *shared understanding* and input from the institutional agents

Next steps

Test the tool (dimensions and indicators) with members of our networked community within the four MSI designations:

- which dimensions to prioritize
- Is transparency a useful notion to assess how colleges support URM students?

Potentially tailor tool to MSI designation

Finalize and publish the self-assessment tool

Disseminate research findings

Thank you!

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Questions

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