The University of Texas at Austin
Charles A. Dana Center

Teaching and Learning in a Texas Pathways Framework

Math pathways and corequisites courses: Next steps for equitable student access and success

Texas Pathways Institute Pre-conference, November 14, 2022

Equity — Access — Excellence

Norms for Equitable Conversations

1. Keep equity central.
2. Understand that those who work, learn.
3. Seek clarification in language and ideas to increase understanding.
   - "Can you tell me more about…,"
   - "How has your experience or upbringing informed your perspective on…"
4. Recognize that everyone has expertise.
5. Look for solutions, not blame.
6. Recognize impact and intent.
7. Be honest.
8. Share talk time.

Institute Purpose

As a result of actively engaging in this Texas Pathways Institute, participating teams will:

- Analyze quantitative and qualitative data to gain insights into existing teaching and learning practices and their differential impact on student outcomes.
- Consider findings and reflections from national experts to inform the improvement of instructional programs within the whole-college pathways redesign efforts.
- Engage with fellow Texas community college colleagues in a peer learning network designed for sharing and learning from the successful scaling of essential teaching and learning practices.
- Develop detailed action plans for improving teaching and learning practices targeting improved student outcomes, especially for Black students, Latino students, and students from low-income backgrounds.

Pre-Session Objectives

As a result of actively engaging in this session, participants will be equipped to impact access to and success in equitable mathematics pathways by:

- Working with and across campus teams to deepen understanding.
- Exploring types of data that contribute to meaningful continuous improvement.
- Identifying ways in which all levels of the institution can have positive impact.
  - System
  - Campus
  - Programs of study
  - Department
  - Classroom
- Contributing to the action plan for improving teaching and learning practices.

Why we (collectively) do this work

100Kin10

Begun with a charge from President Obama's 2011 State of the Union:

100Kin10 is a national initiative dedicated to dramatically increasing the number of high-quality STEM teachers across the country. A component of their work is to hear the voices of students and STEM educators in an effort to surface the barriers to teaching and learning in STEM, and to identify the personal experiences of people that enabled them to succeed in STEM and pursue a career as a STEM educator.

– 100Kin10 Testimonial Analysis

"Respondents who have committed to (a) STEM path did not articulate it as an interest or a career path, but as a passion. The passion is driven by their love of the subject matter, but many referenced that their passion is also catalyzed by their desire to connect and collaborate with others as they learn STEM. STEM, to respondents, is not an individual pursuit. In addition, many articulated that their passion is a function of their interest in helping others. Many students expressed their interest in entering helping professions such as healthcare and education. Others articulated an interest in applying their STEM expertise to solving broader social problems like climate change. Many students chose to pursue a career in STEM, in part, because they wanted to serve as role models for students like them who find themselves as a minority in STEM classrooms."

Student Voice

Let's listen again: What do you hear from Matthew that sparks something you want to know more about?

100Kin10

A strong theme throughout the testimonials is how experiential learning throughout their education experience … was a common element that drove student interest and success in STEM. Examples ranged from elementary classrooms that had animals to observe, to well-designed scientific experiments in high school, to research and work-based learning opportunities like internships.

100Kin10

Student quote:

"[Y]ou can learn as much information as you can in class from a professor or from a textbook. But the only way you really see those things being applied and you actually put those things into practice is when you get hands on experience."

Texas Pathways Institute Pre-Session
Fall 2022

Charles A. Dana Center
at The University of Texas at Austin

Part I – With a Partner (10 minutes)

Here are 3 cups and a can:

1) Make a prediction – Which one would roll in the largest circle? Why?

2) Discuss with your partner. Were your predictions the same?

3) Visit http://map.mathshell.org/lesson_support/rolling_cups/cups_video1.htm
Note the tabs at the top. Simulate rolling each of the glasses and note the roll radius:

Short glass roll radius:

Plastic cup roll radius:

Tall glass roll radius:

Soup can roll radius:

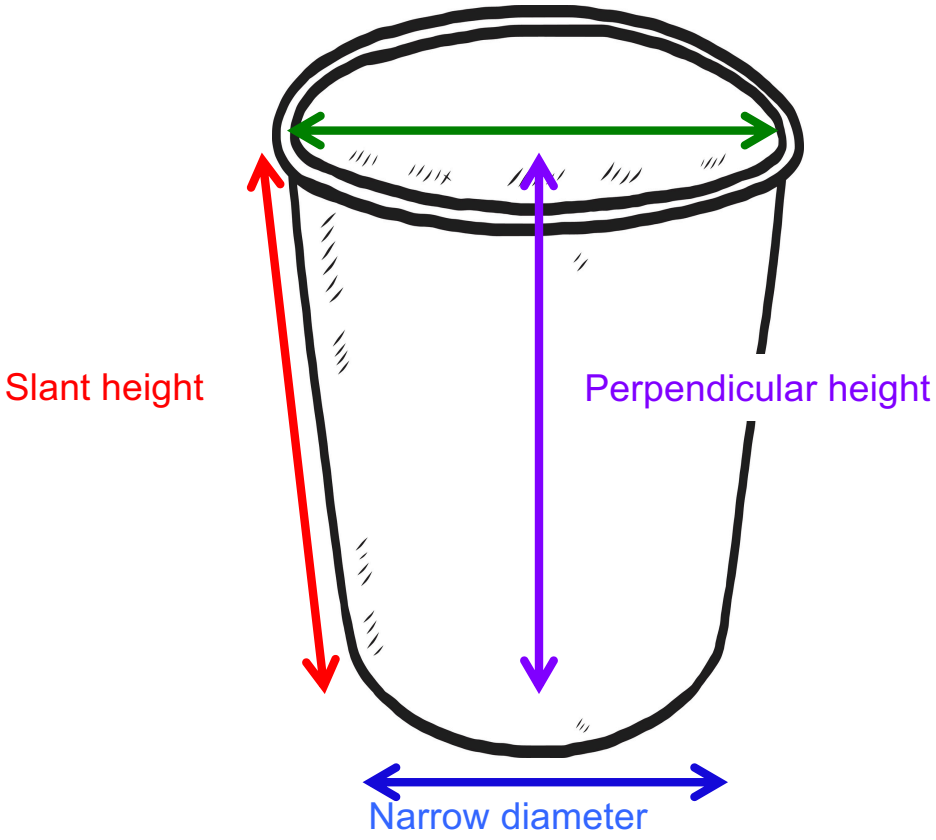
4) Where you surprised by the results? Why or why not?

STOP!

1

Quickly number the odd pages

Rolling Cups



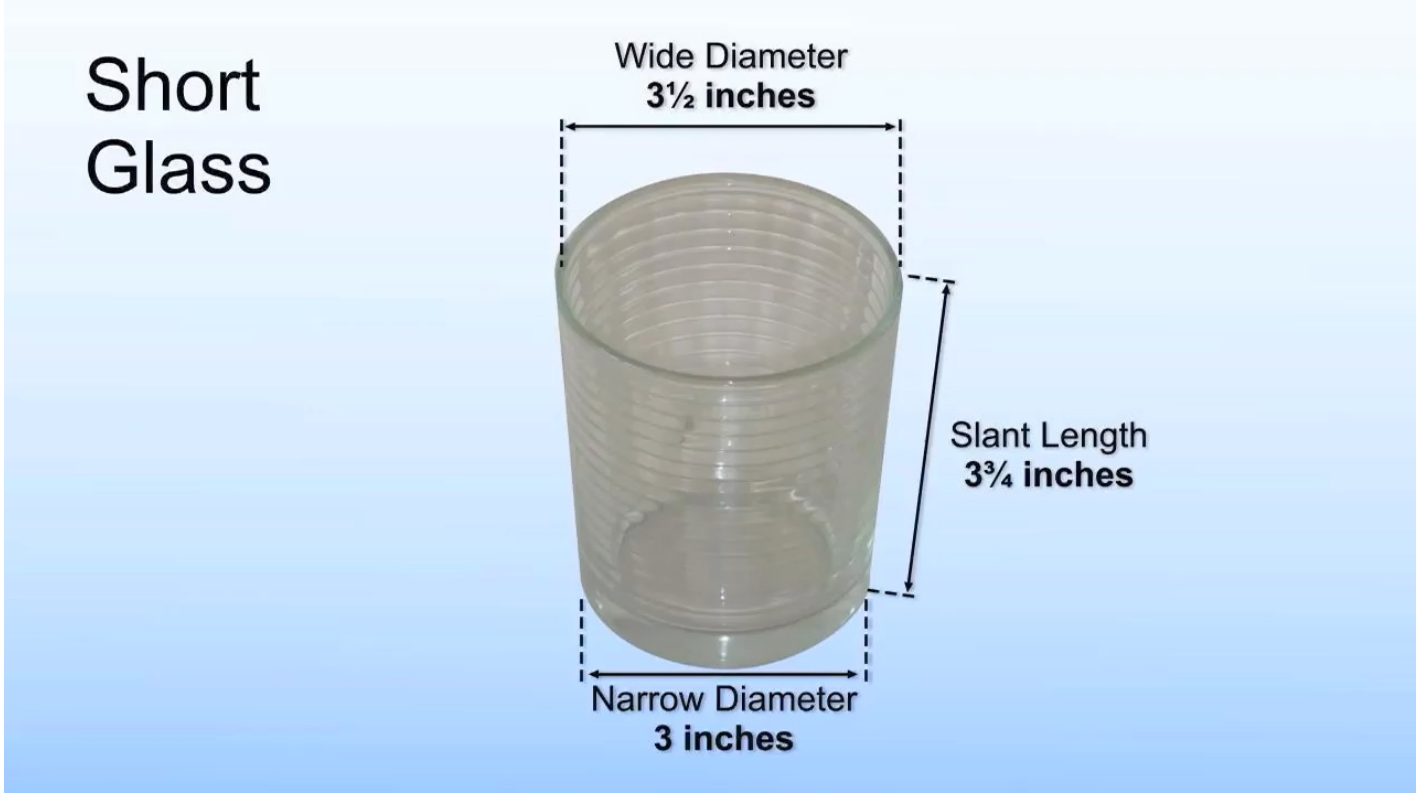
Rolling Cups Individual Prediction: Which one will roll the largest circle?

Here are 3 cups (and one can).

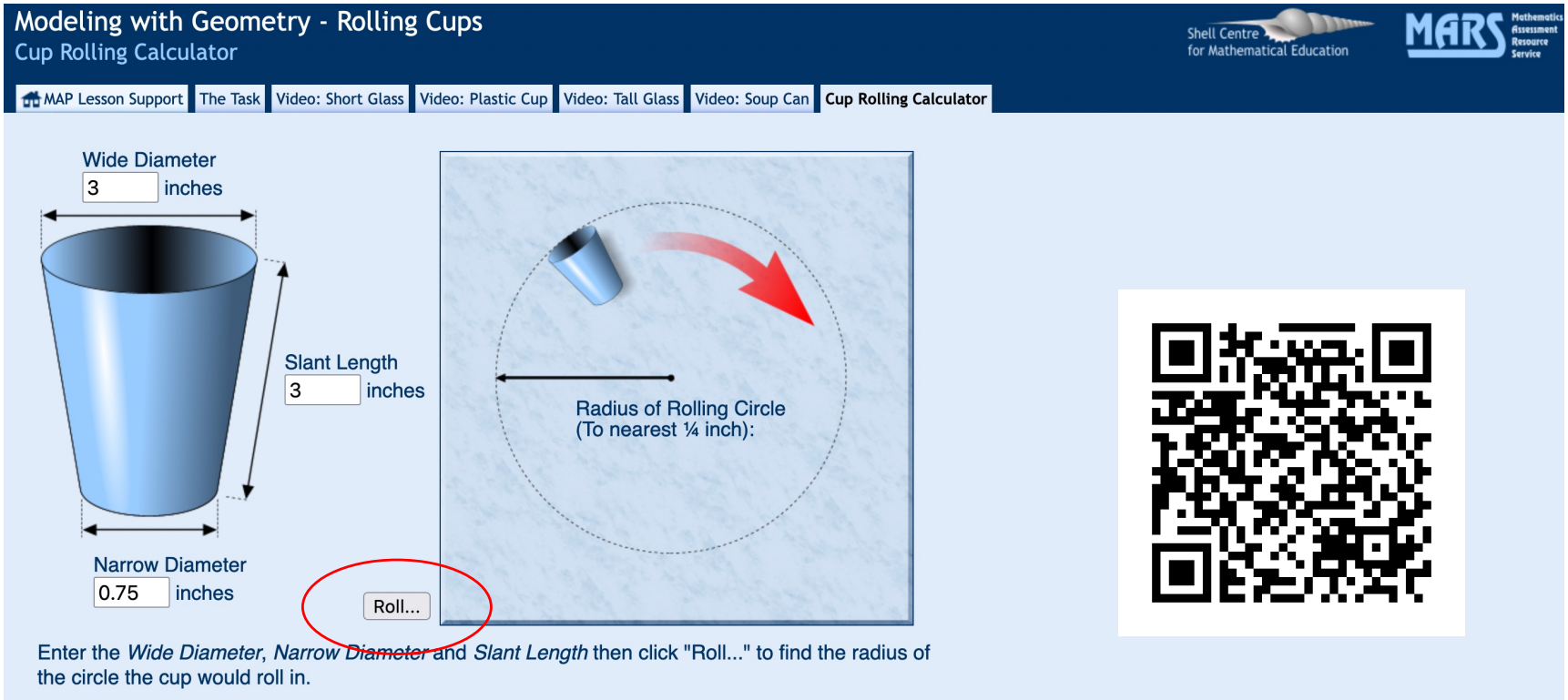
Which one would roll in the largest circle?

.Photo illustration credit: From MAP: Mathematics Assessment Project. (2015). Geometry: Modeling Motion: Rolling Cups: Which Cup? In Shell Centre for Mathematical Education. MARS: Mathematics Assessment Resource Service. 2017 April 27 retrieved from http://map.mathshell.org/lesson_support/rolling_cups/cups_task.htm | Also available in Rolling Cups: Teacher Guide, page T-2 (available via http://map.mathshell.org/lessons.php?unit=9300&collection=8)

Rolling Cups

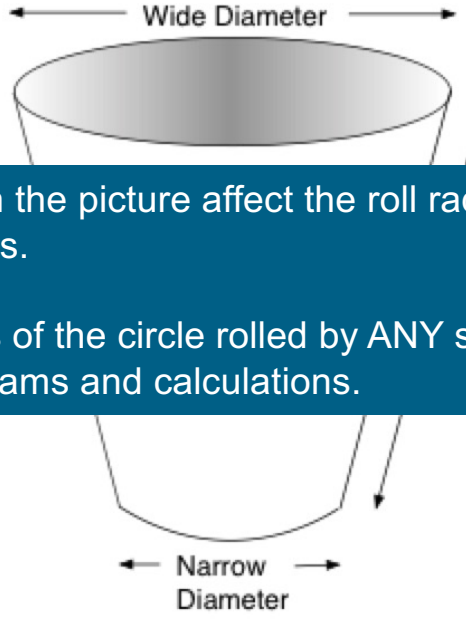


Rolling Cups Online Calculator



Rolling Cups

Cup	Dimensions in inches			
	Wide diameter	Narrow diameter	Slant length	Roll radius
E	3	2	6	18
F	3½	2	3¾	8¾
G	3¾	3	3¾	18¾
H	3½	0	3¾	3¾



- Describe how each of the three lengths shown on the picture affect the roll radius. Show how you used the data to explain your ideas.
- Show how you can use math to predict the radius of the circle rolled by ANY size of cup. Show all your reasoning, including any diagrams and calculations.

Rolling Cups

- Combine pairs so that you are in groups of 4. Each pair explains to the other pair the work they have done thus far.
- Listening to the other pair's description of their work thus far, ask questions so that you understand.
- After both pairs have shared, choose a strategy you can work on together. Work for 15 minutes.

- Describe how each of the three lengths shown on the picture affect the roll radius. Show how you used the data to explain your ideas.
- Show how you can use math to predict the radius of the circle rolled by ANY size of cup. Show all your reasoning including any diagrams and calculations.

Reflection

Go to your assigned corner of the room and group into pairs or triads for discussion.

How can you, in your current role, support active or experiential learning?

Choose Our Adventure – Where do we go next?

Vote for as many as you are interested in:

- Impacting Academic Mindsets and Belonging
- Leveraging Cultural Strengths
- Implementing Corequisites with Fidelity
- Evaluating and Improving Your Corequisite Program

Impacting Academic Mindsets

Georgia Corequisite Data Analysis: Distinguishing Factors of Success

Regardless of race/ethnicity, gender, math pathway, preparation level, etc., academic mindsets are closely tied to success in gateway mathematics.

https://completega.org/usg-corequisite-virtual-workshop-reviewing-progress

100Kin10

Support and encouragement from teachers, parents and other role models sparked and sustained students' interest …, the adults who took an interest in their abilities and invested in their personal success had the greatest impact. …. One important finding was the importance of sustained support for students throughout their educational experience was critically important.

DCMP Principles - Empowering Students as Learners

The DCMP advocates for instructional practices and curricular design that

- Help students develop the skills, attitudes, and beliefs necessary to be successful, independent learners.
- Help students develop persistence and skills over time. Further, students develop communication skills and have opportunities to build relationships with peers and faculty.

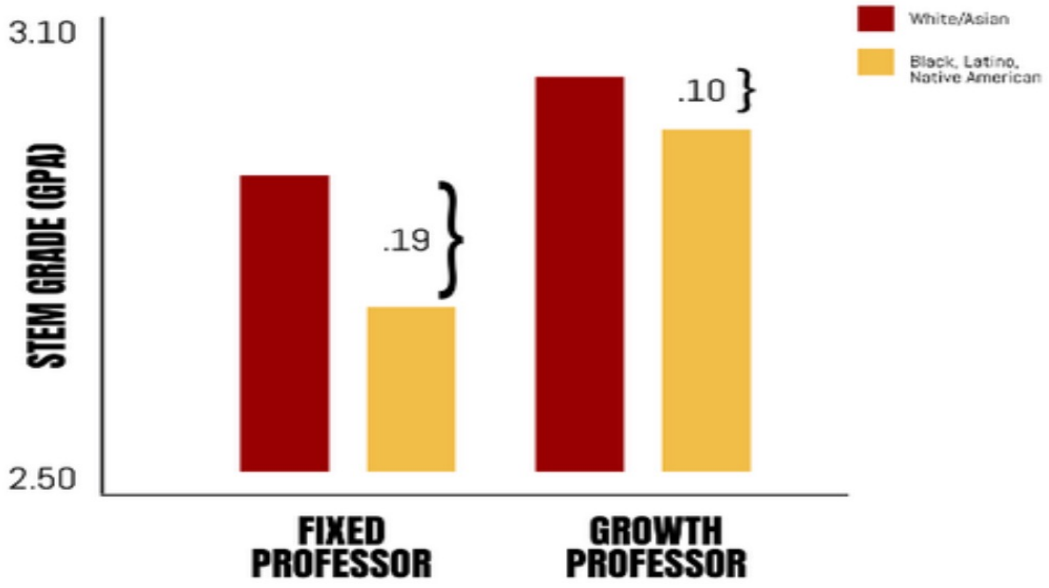
Why Mindsets Matter

- They impact how we and our students interpret and respond to challenges or setbacks, and whether or not we—or our students—are willing to engage in learning or take responsibility for learning
- Mindsets impact choices, behavior, responses, interpretations, etc.
- The mindsets that students have about themselves can change in response to faculty actions.

Effect of faculty fixed mindsets

The findings:

While all students perform better when STEM professors endorse a growth mindset belief, the racial achievement gap is almost halved when professors endorse a growth-mindset belief.



SCIENCE ADVANCES | RESEARCH ARTICLE

SCIENTIFIC COMMUNITY

STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes

Elizabeth A. Canning*, Katherine Muenks†, Doralnne J. Green, Mary C. Murphy*

An important goal of the scientific community is broadening the achievement and participation of racial minorities in STEM fields. Yet, professors' beliefs about the fixedness of ability may be an unwitting and overlooked barrier for stigmatized students. Results from a longitudinal university-wide sample (150 STEM professors and more than 15,000 students) revealed that the racial achievement gaps in courses taught by more fixed mindset faculty were twice as large as the achievement gaps in courses taught by more growth mindset faculty. Course evaluations revealed that students were demotivated and had more negative experiences in classes taught by fixed (versus growth) mindset faculty. Faculty mindset beliefs predicted student achievement and motivation above and beyond any other faculty characteristic, including their gender, race/ethnicity, age, teaching experience, or tenure status. These findings suggest that faculty mindset beliefs have important implications for the classroom experiences and achievement of underrepresented minority students in STEM.

INTRODUCTION

Despite decades of research and millions of dollars in federal funding aimed to understand and ameliorate the underrepresentation of diverse individuals in the STEM (science, technology, engineering, and mathematics) pipeline, Black, Latino, and Native American students [underrepresented racial/ethnic minorities (URM)] continue to underperform academically relative to their White peers (*1*). While these racial achievement gaps are determined by multiple (e.g., economic and structural) factors, they may be exacerbated by subtle situational cues from STEM professors that reinforce racial stereotypes about which social groups are more or less likely to have ability in STEM (*2*).

The cues hypothesis suggests that threatening situational cues in STEM settings, such as the diagnosticity of a test (*2*–*4*), can cause URM students to become concerned about being judged in terms of ability stereotypes, resulting in a loss of motivation, intellectual underperformance, and larger racial achievement gaps in STEM classes (*5*–*7*). This study examines the role of a novel situational cue to stereotype underperformance—STEM college professors' beliefs about the fixedness or malleability of ability (*8*)—and explores whether these faculty beliefs are associated with URM students' motivation and their academic achievement in those professors' STEM courses.

People's mindsets (also known as implicit theories or lay theories) are their beliefs about the fixedness or malleability of human characteristics like intelligence or personality (*8*). Faculty members who espouse fixed mindset beliefs endorse the idea that intelligence and ability are fixed, innate qualities that cannot be changed or developed much. In contrast, faculty who espouse growth mindset beliefs endorse the idea that ability is malleable and can be developed through persistence, good strategies, and quality mentoring. Fixed mindset professors are more likely to judge a student as having low ability based on a single test performance (*9*) and to use unhelpful pedagogical practices, like encouraging students to drop difficult courses (e.g., "not everyone is meant to pursue a STEM career") (*9*).

Faculty who endorse fixed mindset beliefs think that some students have strong, innate intellectual abilities, while others do not. Which students might those be? Pervasive cultural stereotypes suggest that White and Asian students are more naturally gifted in STEM than Black, Latino, and Native American students. Because these American cultural stereotypes impugn the intellectual abilities of URM students, we predicted that faculty who endorse fixed mindset beliefs may be particularly demotivating to URM students, resulting in lower performance among URM students in courses taught by fixed (versus growth) mindset faculty. Classic findings regarding the influence of teacher beliefs on students' performance demonstrate that when teachers have lower expectations for their students, those students become less motivated and perform more poorly in those teachers' classes (*10*). These Pygmalion effects are even stronger for URM students (*11*, *12*).

We hypothesized that STEM professors' fixed beliefs about intelligence and ability would lead URM students to experience lower motivation and to underperform relative to their non-stereotyped peers—a pattern consistent with stereotype threat theory. Classic studies that document stereotype threat underperformance effects typically manipulate threatening (versus nonthreatening) situational cues in the learning environment, such as an experimenter's race/ethnicity/gender, and assess students' intellectual performance as the primary indicator of stereotype threat (*2*, *7*, *13*, *14*). Drawing on this theoretical framework, the present study examines the role of college professors' mindsets as a situational cue that triggers URM underperformance in STEM courses. We argue that if STEM faculty who endorse fixed mindset beliefs engender stereotype threat among URM students, we should observe lower student motivation and substantially larger racial achievement gaps in those professors' courses compared to courses taught by STEM professors who endorse growth mindset beliefs.

The present study investigates undergraduate STEM faculty's self-reported mindset beliefs and their implications for student motivation and performance. Previous research has examined students' perceptions of faculty beliefs (*15*), yet no study, to our knowledge, has examined actual self-reported mindset beliefs of STEM faculty as a predictor of student performance. Furthermore, the effects of

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What do we mean by psychosocial factors?

Factors that are important to learning, yet not tied to specific course content.

Other common names for these factors/strategies are…

- Academic mindsets
- Noncognitive factors
- Productive persistence
- Self-regulation
- Social and Emotional Learning
- Grit
- Motivation
- Soft skills

What does the term "psychosocial factors" mean to you. How do you think they impact teaching and learning?

Learning mindsets and self-beliefs

3 Learning Mindsets (self-beliefs) and related questions.

Capability

- Can I do this? Is this subject too hard? Will I be successful?

Purpose

- How is this topic/domain/course related to the goals I have for myself, my family, or my community?

Belonging

- Are people like me successful with this topic/domain/course? Do I fit in in this class/domain? Will I be accepted in this learning community?

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Student quote:

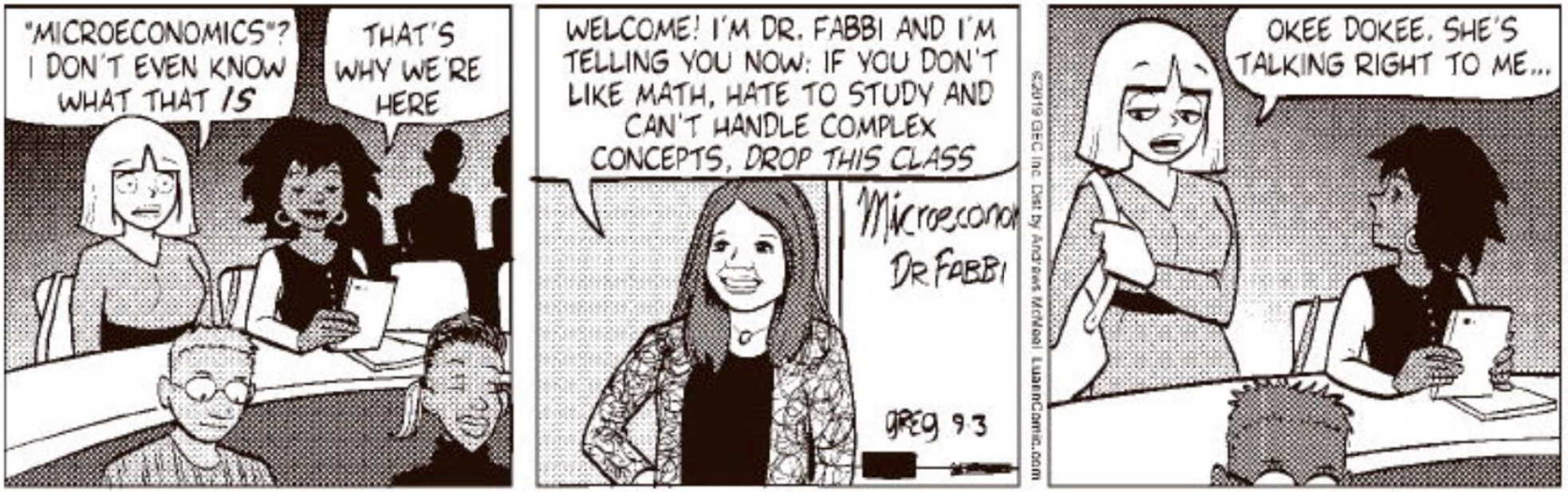
"It shouldn't be a competition on who could better, but instead, we could learn from each other to create a final product that can help other people. After this experience, I learned that imposter syndrome only impacts you if you allow it to consume you."

Why mindsets matter

Mindsets matter because:

- They impact how we and our students interpret and respond to challenges or setbacks, and whether or not we—or our students—are willing to engage in learning or take responsibility for learning
- Mindsets impact choices, behavior, responses, interpretations, etc.
- The mindsets that students have about themselves can change in response to faculty actions.

LUANN By Greg Evans



What do we mean by "Belonging"?

- A feeling that one is connected to others, belongs to a community; sense of kinship
- Refers to the social nature of being humans
- Belonging is a basic psychological need

"Students with a sense of belonging feel socially connected, supported, and respected. They trust their faculty and their peers, and they feel a sense of fit at school. They are not worried about being treated as a stereotype and are confident that they are seen as a person of value."

Deci and Ryan et al; Mindset Scholars Network

Belonging vs. fitting in

Some quotes from students

- *Belonging is being somewhere you want to be, and they want you. Fitting in is being somewhere you really want to be, but they don't care one way or the other.*
- *Belonging is being accepted for you. Fitting in is being accepted for being like everyone else.*
- *I get to be me if I belong. I have to be like you to fit in.*

Brown, Brené. (2012) *Daring Greatly: How the Courage to be Vulnerable Transforms the Way We Live, Love, Parent, and Lead* New York: Gotham Books.

Belonging mindsets

Developing field of inquiry

Catherine Good, David Yeager, Geoffrey Cohen and Greg Walton

Findings

- Belonging is related to achievement
- Students are more likely to question belonging during transitions (especially students already minoritized by educational systems or other societal prejudice; including students of the global majority, 1st generation, low income, LGBTQIA2+, immigrants, females in certain fields, etc.)
- Classroom-level factors have greater impact than campus-level factors

Impacts on belonging

"Although peer relationships have a strong effect on students' attitudes toward school and themselves, the research is quite consistent that educators have the strongest and most direct effect on students' psychological experience in the classroom."

Karen Osterman

Hofstra University

What do you currently do to foster a sense of belonging in your classroom?

Fostering belonging – going beyond access

Using the syllabus to support student belonging

We know that since we increased access to our transfer-level courses, more students have the opportunity to complete these courses!

- Challenge: Our current population of students may need guidance and support, and we can decrease anxiety and strive to increase retention and success rates by communicating to students that they belong in our classes.
- One Solution: Revising our syllabi is a practical way to promote students' sense of belonging, starting with the very first document our students ever see!

Belonging Mindset

Why the syllabus matters

- It sends the first impression of the instructor. Is the instructor approachable? friendly? supportive?
- Communicates the instructor's attitude toward learning and students.
- Tells students whether or not the instructor expects them to be successful and gives details on how they can achieve success.

Modifying the syllabus

What kind of changes can we make?

- Tweaking language/tone: choose language that makes students feel hopeful and avoid using advanced academic language.
- Describe campus resources and other supports available.
- Explain the purpose of course policies and their impact on student success.
- Improve aesthetics, such as
  - Use images - a great way to engage your students' emotions, describe complex ideas, and appeal to non-native English speakers.
  - Headings and bulleted lists rather than long paragraphs.
- Be clear about flexible policies - e.g., late work.

*Adapted from @ONE Equity and Culturally Responsive Online Teaching Course, 2019

Discussion

Brainstorm/share other tools and strategies for promoting a belonging mindset among students.

What can I do to promote a belonging mindset:

- In my role?
- College-wide?
- In the community?

Best Practice Commitment

Identify one action or change you will implement in your work to promote student belonging.

Building on Cultural Strengths

100Kin10

…[P]rofound barriers for minoritized populations came through in many of the testimonials. Overt acts of racism and sexism experienced by students demonstrated the psychological toll of pursuing a path where BIPOC students and female students are a significant minority. These experiences are further compounded by systemic inequities in education systems that limit access to high-quality learning experiences in STEM among students who attend under resourced urban institutions.

100Kin10

Student quote:

"Math was a common language across cultures and experiences, and because of this, began to appeal more to my interests. I love creating relationships, learning about other cultures, and solving problems. Math, I learned that year, was the beautiful bridge between all three."

Outcomes for Teaching Across Cultural Strengths

In this section, participants will:

- Investigate cultural frameworks in teaching and learning,
- Explore and discuss how cultural practices impact teaching and learning, and
- Take steps toward incorporating culturally responsive and sustaining practices that support equitable teaching and learning.

Culturally Responsive and Sustaining Pedagogy

Considerations for Teachers
In general…

We teach
the way that
we were taught.

We ignore the
diversity that
we do not see..

Cultural Frameworks

What are cultural frameworks?

"Cultural frameworks and worldviews are the underlying tenets of assumptions, beliefs and values that influence our behavior in everyday life."

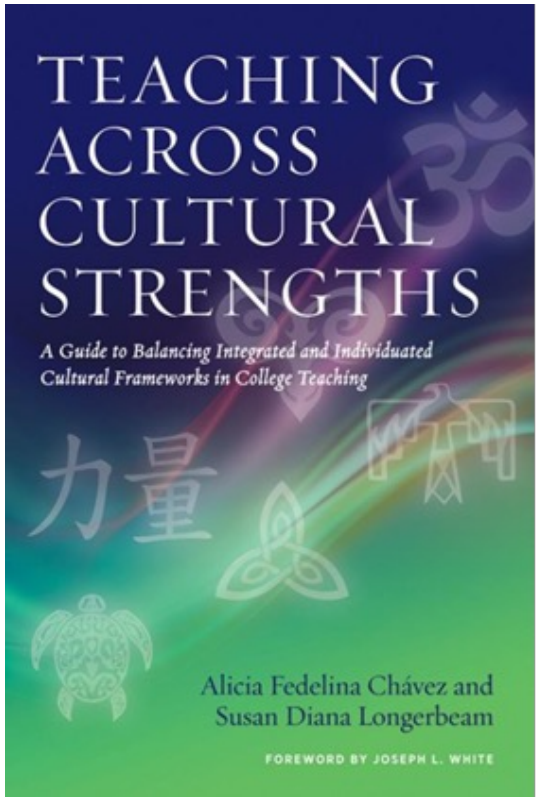
- Mostly unconscious
- Are taught in overt and covert ways
- Are the cultural lenses through which we view the world.

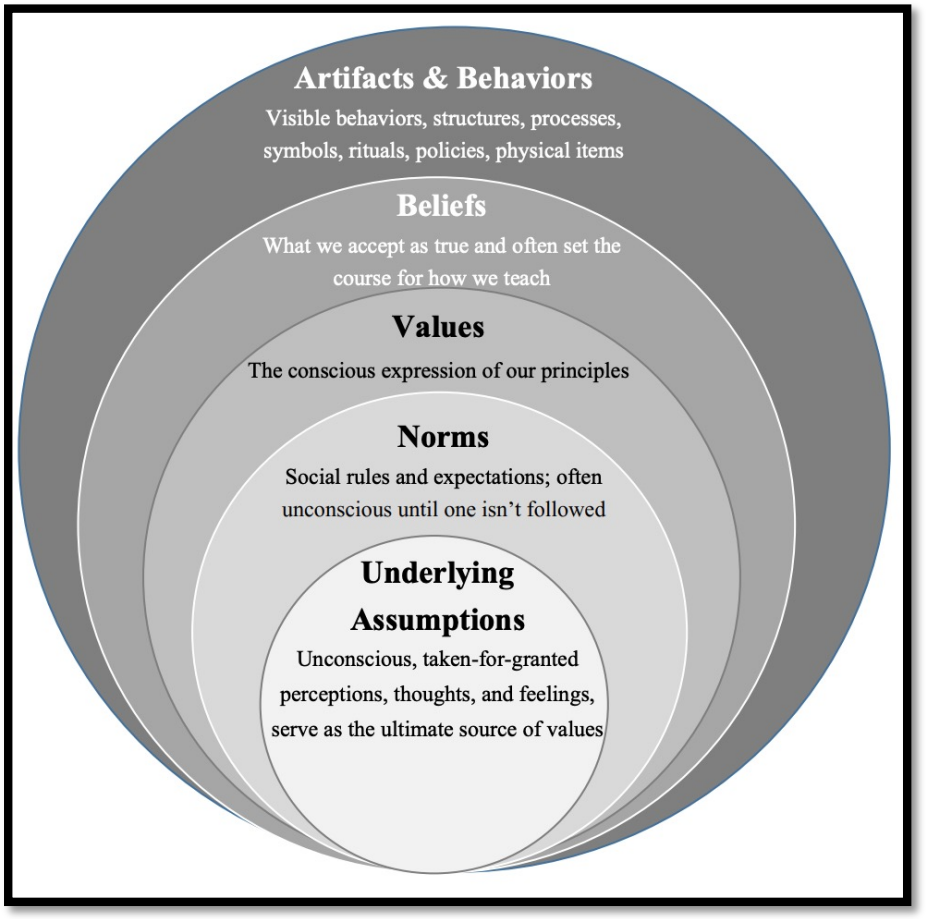
Chávez, A. F. & Longerbeam, S. D. (2016). *Teaching across cultural strengths: A guide to balancing integrated and individuated cultural frameworks in college teaching*. Stylus.

Frameworks

1. Purpose of learning
2. Ways of taking in a processing knowledge
3. Interconnectedness of what is being learned
4. Responsibility for learning
5. Time
6. Role of the teacher
7. Student interactions
8. Sequencing

Elements of Culture





Chávez, A. F. & Longerbeam, S. D. (2016). *Teaching across cultural strengths*. Stylus.

Where are you?

Cultural Frameworks in Teaching and Learning

Individuated *In a culturally individuated framework, a private compartmentalized, linear, contextually independent conception of the world is common, assumed, and valued.*	⟷	**Integrated** *In a culturally integrated framework, an interconnected, mutual, reflective cyclical, contextually dependent conception of the world is common, assumed, and valued*
Knowledge, individual competence, to move forward toward goals and the betterment of humanity	**Purpose of Learning**	Wisdom, betterment of the lives of those with whom we are connected - family, tribe, and community
Mind as primary, best, or only funnel of knowledge	**Ways of Taking in and Processing Knowledge**	Mind, Body, Spirit/Intuition, Reflection, Emotions, Relationships as important aspects and conduits of knowledge
Compartmentalized and separate; belief that understanding how the parts work sep[illegible] in isolation will lead to the greatest understanding	**Interconnectedness of What is Being Learned**	Contextualized and connected, belief that understanding how [illegible]ach other within the whole, and within family and community will facilitate understanding
Learning is a private, individual activity; responsible for one's own learning so that family and others are not burdened	**[illegible] Learning**	Learning is a collective, shared activity, Responsible for one's own as well as others' learning
Linear, task oriented, can be measured and used, to be on time shows respect	**Time**	Circular, seasonal, process oriented, dependent on relationships, to allow for enough time shows respect
Provider and Evaluator of Knowledge -- best perspectives and ways of learning, predetermined bounded learning; communication primarily between teacher and students	**Role of the Teacher, Control**	Facilitator of Learning Experiences -- multiple perspectives and ways of learning, emergent constructivist; wide variety of interactions between students, and between teacher and students
Others' perspectives are optional for learning. Primarily rely on verbal messages; individuals are paramount, predominantly verbal in both written and oral communications	**Student Interactions**	Others' perspectives and interpretations are important, even essential to learning. High use of nonverbals, collective as paramount, and multiple streams of communication
Learning by mastering abstract theory first, followed by testing. Unlikely to include application, experience, or doing in real life	**Sequencing**	Learning by doing, listening to others' experiences, imagining or experiencing first, then drawing out abstract theory

Chávez & Longerbeam (Stylus, 2016). The earliest version of this model was presented in a paper at the 2009 ASHE Conference and we then developed this model from a later version of in Ke & Chávez (2013).

Where are you?

Strongly Individuated

Strongly Integrated

A Continuum of Behaviors, Beliefs, Assumptions, Priorities

In a culturally **individuated** framework, a private compartmentalized, linear, contextually independent conception of the world is common, assumed, and valued.

In a culturally **integrated** framework, an interconnected, mutual, reflective cyclical, contextually dependent conception of the world is common, assumed, and valued.

Chavez, A. F., & Longerbeam, S. D. (2016). *Teaching across cultural strengths*. Stylus.

Small Group Share

1. What surprises you?
2. What questions does it raise?
3. How might this information help you "see" your students in new ways?

Reflecting on Cultural Frameworks

How might a student with a cultural framework dissimilar to yours experience your courses (or interactions with you) in contrast to a student with a similar cultural framework?

Culturally Responsive Teaching and Learning

Current Understandings

What does it mean to you?

In what ways might it support the students you are serving?

Culturally Responsive and Sustaining Pedagogy

- Empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes.
  – *Gloria Ladson-Billings*
- Uses the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more relevant and effective. – *Geneva Gay*
- Affirms that cultural knowledge, frames of references and performance styles of ethnically diverse students constitute "funds of knowledge."
  – *Moll et al*
- Honors our students and their histories, culture, language, and unique ways of knowing and being in the world." – *Cathery Yeh*

Both – And*: A Cultural Key to Learning

An important key to learning in a culturally diverse context is a "both-and" conception and practice of learning and teaching processes. This conception occurs when learners experience **both the comfort** of their own culturally natural framework of learning **and the challenge** of negotiating other cultural frameworks of learning. Drawing on both realms creates the balance of comfort and dissonance necessary for complex learning.

* Both-And is part of the integrated framework.

Page 16 in Chávez, A. F., & Longerbeam, S. D. (2016). *Teaching across cultural strengths.* Stylus.

Culturally Responsive Teaching

Attend to:

- Classroom culture/learning environment
- Curriculum
- Instruction/Pedagogical Practice

Brain Structures Activated During Learning

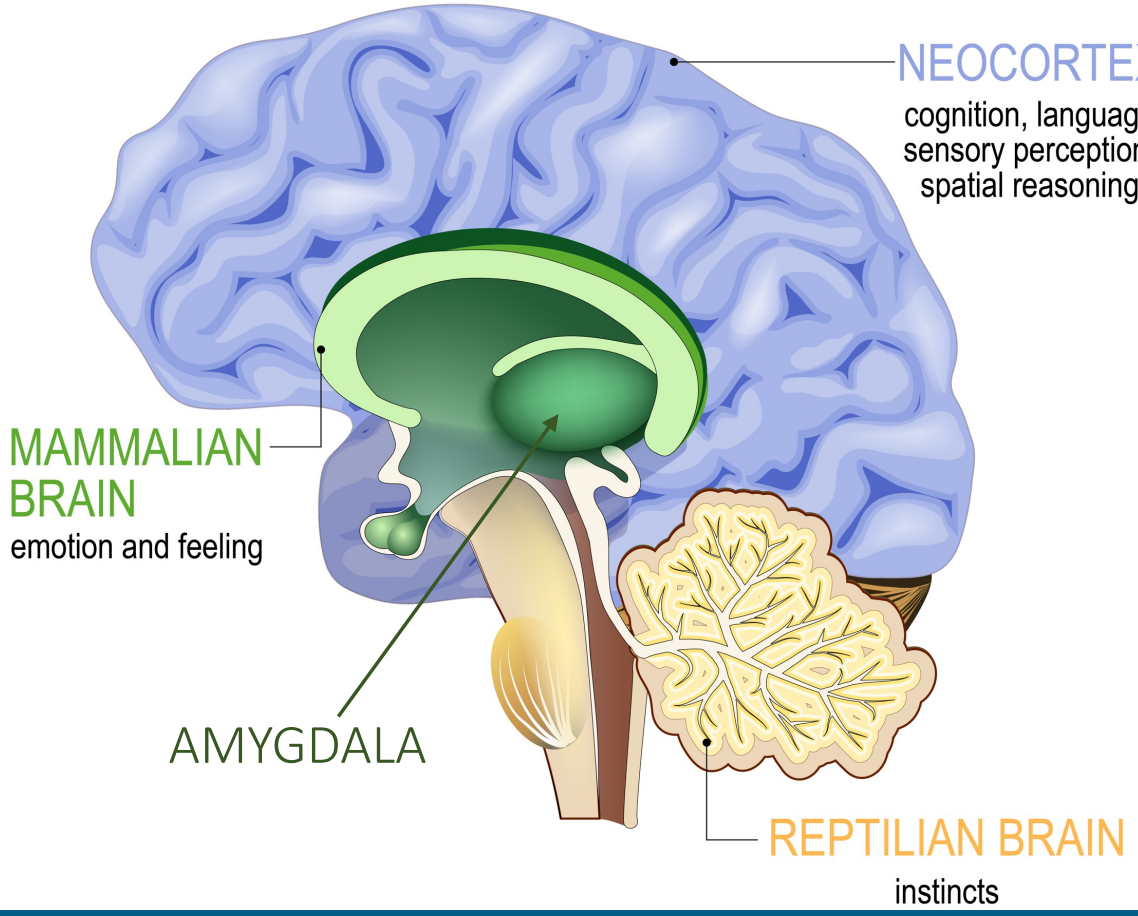
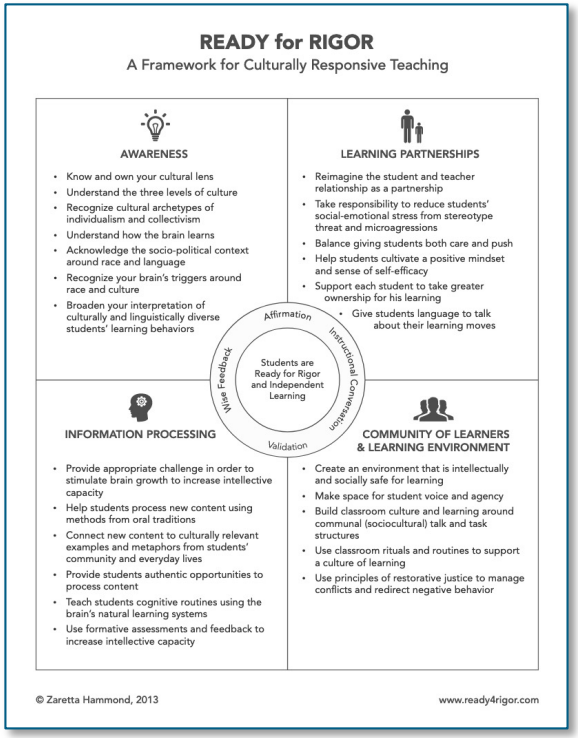


Image credit: istockphoto

Culturally Responsive Teaching and the Brain

1. Know your own cultural lens
2. Recognize cultural archetypes of individualism and collectivism
3. Balance giving students both care and push
4. Support each student to take greater ownership for his learning
5. Help students process new content using methods from oral traditions
6. Use formative assessments and feedback to increase intellective capacity.



Hammond, Z. (2013)

Looking in the Mirror on Culturally Responsive Teaching

1. Know your own cultural lens
2. Recognize cultural archetypes of individualism and collectivism
3. Balance giving students both care and push
4. Support each student to take greater ownership for his learning
5. Help students process new content using methods from oral traditions
6. Use formative assessments and feedback to increase intellective capacity.

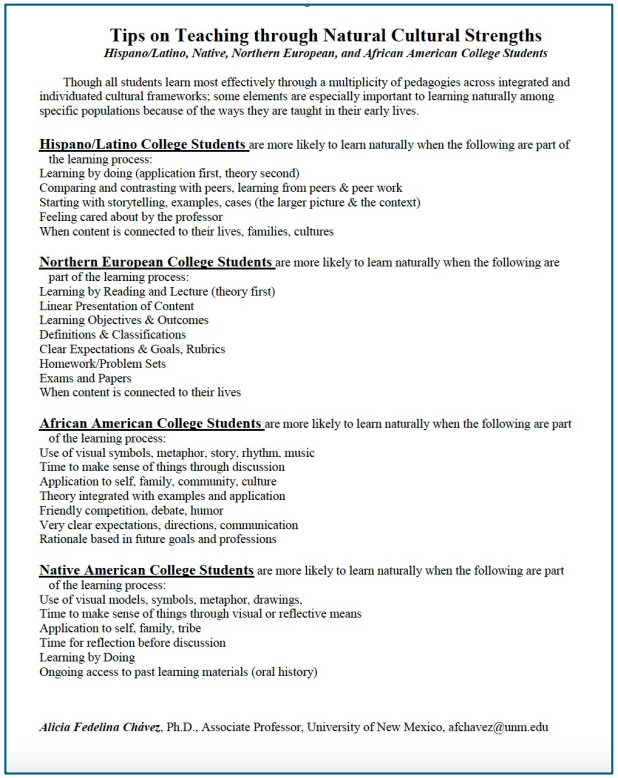
Which of these do you feel like you already do well?
Which do you want to learn more about?

Hammond, Z. (2013)

Tips on Teaching through Natural Cultural Strengths (p. 10)

✓ Put a check mark by strategies you already use.

\+ Put a plus by strategies you will try.



Tips on Teaching through Natural Cultural Strengths

Hispano/Latino, Native, Northern European, and African American College Students

Though all students learn most effectively through a multiplicity of pedagogies across integrated and individuated cultural frameworks; some elements are especially important to learning naturally among specific populations because of the ways they are taught in their early lives.

Hispano/Latino College Students are more likely to learn naturally when the following are part of the learning process:
Learning by doing (application first, theory second)
Comparing and contrasting with peers, learning from peers & peer work
Starting with storytelling, examples, cases (the larger picture & the context)
Feeling cared about by the professor
When content is connected to their lives, families, cultures

Northern European College Students are more likely to learn naturally when the following are part of the learning process:
Learning by Reading and Lecture (theory first)
Linear Presentation of Content
Learning Objectives & Outcomes
Definitions & Classifications
Clear Expectations & Goals, Rubrics
Homework/Problem Sets
Exams and Papers
When content is connected to their lives

African American College Students are more likely to learn naturally when the following are part of the learning process:
Use of visual symbols, metaphor, story, rhythm, music
Time to make sense of things through discussion
Application to self, family, community, culture
Theory integrated with examples and application
Friendly competition, debate, humor
Very clear expectations, directions, communication
Rationale based in future goals and professions

Native American College Students are more likely to learn naturally when the following are part of the learning process:
Use of visual models, symbols, metaphor, drawings,
Time to make sense of things through visual or reflective means
Application to self, family, tribe
Time for reflection before discussion
Learning by Doing
Ongoing access to past learning materials (oral history)

Alicia Fedelina Chávez, Ph.D., Associate Professor, University of New Mexico, afchavez@unm.edu

Chávez, A. F. & Longerbeam, S. D. (2016). *Teaching across cultural strengths*. Stylus.

For Further Exploration

- Consider a more in-depth book study using Teaching Across Cultural Strengths.
- Engage in an autobiography about your culture of teaching or, if not a faculty member, about your ways of interacting with individual students and groups.
- Observe other faculty whose frameworks are unique from yours and/or more balanced.
- Adapt your class welcome letter/video and syllabus for the upcoming term in ways that signal your approach to students' cultural strengths.
- Choose some major aspect of one of your courses each semester. Culturally analyze and balance that aspect across integrated and individuated cultural frameworks.

What does it mean to implement corequisites with fidelity?

Implementing with Fidelity

What are “non-negotiables” vs what can or should be customized to local context?

- Structures
- Policies
- Practices

Equity Check for Guided Pathways and Math Pathways

Does the demographic composition of **students in each pathway** reflect the overall student population?

Does the demographic composition of **students referred to developmental education** reflect the overall student population?

Equity Check for Guided Pathways and Math Pathways

Does the demographic composition of **students utilizing support services** reflect the overall student population?

Are **student outcomes** high and equitable across all student groups?

Best Practices for Corequisites

Do:

- ❑ Align content so that students are truly getting just-in-time remediation.
- ❑ Provide a sufficient number of hours of support, based on student need.
- ❑ Require structured content.
- ❑ Run side-by-side or embedded remediation.
- ❑ Inspect data regularly.

Don't:

- ❖ Run a traditional developmental course side-by-side with the college-level course.
- ❖ Determine hours of support based on what is easiest to schedule.
- ❖ Run an unstructured homework hour.
- ❖ Focus solely on individual course pass rates (rather, inspect throughput).

Recommendations

- ✓ Department works together to reach consensus on each college-level course's topics and sequence (develop a common course calendar).
- ✓ Department backmaps from that common calendar to achieve a common calendar for the support course.
- ✓ Math department (or institution) provides professional learning to faculty who have always taught developmental algebra but are now teaching statistics support or QR/Contemporary support.
- ✓ Department encourages faculty collaboration and communication.
- ✓ Department engages in continuous improvement processes, including gathering qualitative and quantitative data from both students and faculty.
- ✓ Department collaborates to choose psychosocial factors on which to focus and provide instruction to students.
- ✓ Consider placing students at ABE 4 into corequisites and providing sufficient support.

Program Evaluation and Improvement

Continuous Improvement for Systemic Change

Where are you going?
What is your goal?
What do you want your students to accomplish in the long run?

How will you get there?
Actions to improve structural, curricular, and pedagogical changes.

What will tell you that you've arrived?

Evidence - quantitative and qualitative - along the way and at the end.

Did your students achieve?

Goals of Internal Evaluation

- Guide continuous improvement work:
  - Monitor progress
  - Surface challenges in implementation
  - Strategically deploy resources and supports

- Develop a strong local evidence base to continue to mobilize change

The next few slides have program assessment ideas but...

I'm thinking that maybe we should just put up posters around the room that have titles related to program assessment (both quantitative and qualitative) and have people do a snowball type activity, where they start at one poster and add their ideas, move to next poster, check mark those they do also, make a note of the ideas they want to take back to campus, add their own ideas, and rotate.

Then they could go back to their role-alike corners and exchange ideas and refine their thinking.

Program Assessment Ideas

1. Success rates
2. Feedback processes
3. Department-wide policies OR compare differences
4. Common course assessments

Program Assessment Ideas

1. Success rates
   - Comparing college-ready students to coreq students
   - Comparing coreq students to traditional developmental students
   - Comparing by math pathway
   - Comparing sub-populations (gender, race/ethnicity, SES, etc)
   - Comparing by placement band
2. Feedback processes
   - Students and faculty
   - Surveys and/or focus groups
3. Department-wide policies on attendance, grades, etc., OR allow differences and compare
4. Consider common exams, mid-terms, and/or finals (or at least common questions for comparison purposes)

Student Survey

Question 6: What particular features of (the co-req) did you find to be most helpful?

"The layout of the program was just fantastic! It went right a long with the (statistics) class."

"The (co-req) work DID NOT correspond to the (stats) work."

"I found it helpful that I had other students to talk with from other classes."

"Each of the (co-req) lectures went along well with the (stats) lectures that followed the next day."

"The day by day content that was reviewed on Mon and Wed was behind the subject matter for the (stats) course. Basically I had to pay money and set in class two days a week and (do) work that wasn't graded to help with (stats) material that we had already been graded on."

Student Survey

Question 7: What improvements do you think would be most beneficial if implemented in future (co-req) courses?

1. *"It should have its own grade not the same as (stats) class."*
2. *"Students stopped really coming once they realized their grade for the Math 0530 class came from the Math 1530 class."*
3. *"Teachers should be more prepared to answer (stats) questions."*
4. *"There is so much lack of communication between the teachers themselves and the teachers and students that this course is a HUGE disappointment. And if you pull up my grades, you will see I am typically an A student."*
5. *"(The co-req) should be taken the class time before (stats)."*

Faculty Survey

Cal State LA Weekly Instructor Survey – Week 3 Survey

Q1. Please provide feedback on the syllabus – especially for this past week. What should be removed/added? How could lab sheets be improved?

- I don't think anything needs to be removed. However, the time we had for covering this much material was not sufficient given the fact, we had 4 days of instruction and not 5.
- The schedule for Week 3 was very tight. I would like to spend more time on rational expressions and less time on complex numbers. For Section 8.1, we can focus on using i notation for square root of negative numbers and remove operations on complex numbers.
- Worksheet 13 should be moved to Week 5.
- The syllabus is clear and concise, nothing should be added or removed. The lab sheets should provide some more complex problems.

Faculty Survey

Cal State LA Weekly Instructor Survey – Week 3 Survey

Q2. Please look at the next chapter (HW and lab sheets). Would you like to see any adjustments?

- I think there are too many problems and students usually have a difficult time to do all the homework problems in the time frame that they have.
- For some of the questions (such as Q4) in 8.3 homework, students were not sure how to input their answers.
- I will use Worksheet 13 in Week 5. Everything else looks fine.
- No adjustments.

Program Assessment Ideas

1. Success rates
   - Comparing college-ready students to co-req students
   - Comparing co-req students to traditional developmental students
   - Comparing by math pathway
   - Comparing sub-populations (gender, race/ethnicity, SES, etc)
   - Comparing by placement band
2. Feedback processes
   - Students and faculty
   - Surveys and/or focus groups
3. Department-wide policies on attendance, grades, etc., OR allow differences and compare
4. Consider common exams, mid-terms, and/or finals (or at least common questions for comparison purposes)

Program Assessment Ideas

5. Longitudinal measures

- Retention rates
- Success in the next math course
- Success in courses that require students to be college-ready-in-math (e.g. science courses – did letting students in the math coreq take their science class hurt their science performance?)
- Success in courses that do not have the college-ready-in-math requirement.
- Be sure to track both college-ready and coreq students!

Considerations in Evaluation Planning

- What are the metrics of interest (key performance indicators)?
  - Stakeholder perceptions and experiences
  - Course offerings
  - Student enrollments
  - Student learning
  - Student outcomes
    - Course level
    - Progression
    - Transfer
    - Credential completion
- What subgroups can be analyzed separately?
- What are expected outcomes, given implementation timeline?

Closing and Next Steps

Pre-Session Objectives

As a result of actively engaging in this session, participants will be equipped to impact equitable mathematics pathways access and success by:

- Working with and across campus teams to deepen understanding.
- Exploring types of data that contribute to meaningful continuous improvement.
- Identifying ways in which all levels of the institution can have positive impact.
  - System
  - Campus
  - Programs of study
  - Department
  - Classroom
- Contributing to the action plan for improving teaching and learning practices.

Reflecting on the Day

What?

What important ideas surfaced today?

Gut?

What surprised me?

What was unclear?

So what?

What are the implications for me in my position at our campus?

Image credit: baramee2554 / iStock

Resources

100Kin10. (n.d.). Testimonial analysis. For information about 100Kin10, visit https://pathto100k.org/.

Chávez, A. F. & Longerbeam, S. D. (2016). *Teaching across cultural strengths: A guide to balancing integrated and individuated cultural frameworks in college teaching*. Stylus Publishing..

Hammond, Z. (2013). Ready for Rigor: A Framework for Culturally Responsive Teaching. https://crtandthebrain.com/wp-content/uploads/READY-FOR-RIGOR_Final1.pdf

Harris, F., & Wood, L. (2020, March 26). *Employing equity-minded and culturally-affirming teaching and learning practices in virtual learning communities* [webinar]. CORA Learning. https://www.youtube.com/watch?v=aMrf_MC5COk&t=1169s

Ladson-Billings, G. (2014). Culturally relevant pedagogy 2.0: a.k.a. the Remix. *Harvard Educational Review, 84*(1), 74–84. https://doi.org/10.17763/haer.84.1.p2rj131485484751

McNair, T., Bensimon, E., & Malcom-Piqueux, L. (2020). *From equity talk to equity walk: Expanding practitioner knowledge for racial justice in higher education.* John Wiley & Sons, Incorporated.

Resources

Moll, L., Amanti, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory Into Practice, (31)*2, 132–141. doi: 10.1080/00405849209543534

Paris, D. (2012). Culturally sustaining pedagogy: A needed change in stance, terminology, and practice. *Educational Researcher*, *41*(3), 93–97. https://doi.org/10.3102/0013189X12441244

Peralta Community College District. (2019). Peralta Online Equity Rubric v.2.0, https://web.peralta.edu/de/equity-initiative/equity/

Shell Centre for Mathematical Education. (2017). MARS: Mathematics Assessment Resource Service. *Geometry: Modeling Motion: Rolling Cups: Which Cup?* 2017 April 27 retrieved from http://map.mathshell.org/lesson_support/rolling_cups/cups_task.html. Also available in Rolling Cups: Teacher Guide page T-2 (available via http://map.mathshell.org/lessons.php?unit=9300&collection=8)

Yeh, C. (2020). *Steps to make classrooms more culturally responsive* [Blog post]. Ed Week interview by Larry Ferlazzao. https://blogs.edweek.org/teachers/classroom_qa_with_larry_ferlazzo/2020/03/steps_to_make_classrooms_more_culturally_responsive.html

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More on Equity-Minded Practices

Equity-Mindedness and Universal Design

"Multiple means of representation" also refers to how we present ourselves and our academic discipline to students:

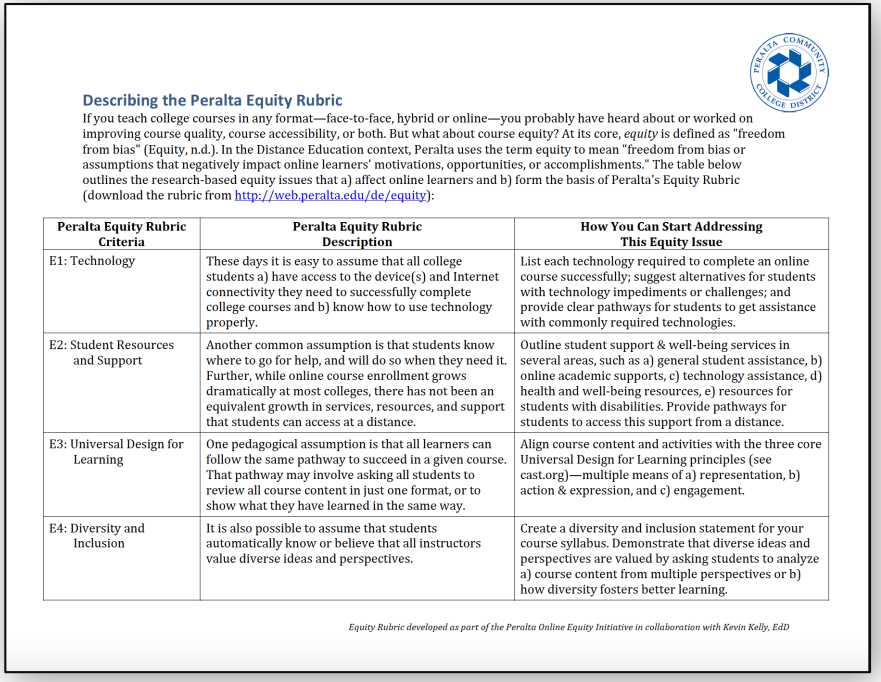
- Ensure that minoritized students see themselves and their lives in syllabi, assignments, and other instructional materials (texts, ideas, special projects, etc.).
- Make race visible in syllabi including texts, videos, and other teaching artifacts authored by racially minoritized scholars, authors, and cultural critics.
- Utilize a variety of instructional strategies from along the spectrum of individuated to integrated learning.
- Create a learning plan to become familiar with minoritized writers, poets, sociologists, political scientists, philosophers, scientists, mathematicians, artists, and musicians.

Equity-Mindedness, UDL, and the Course Syllabus

"For racially or ethnically minoritized students who have experienced exclusion, marginalization, discrimination, and oppression in educational settings and elsewhere, the syllabus is a tool that faculty can use intentionally to demystify the implicit norms and ambiguous processes that need to be learned to navigate college successfully."

McNair, Bensimon, & Malcolm-Piqueux (2020)

Peralta Equity Rubric

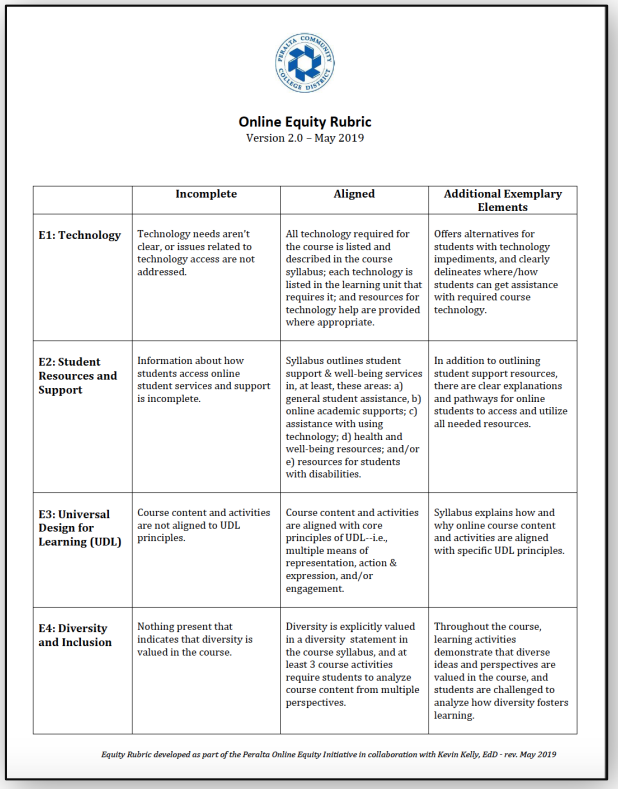


Describing the Peralta Equity Rubric

If you teach college courses in any format—face-to-face, hybrid or online—you probably have heard about or worked on improving course quality, course accessibility, or both. But what about course equity? At its core, *equity* is defined as "freedom from bias" (Equity, n.d.). In the Distance Education context, Peralta uses the term equity to mean "freedom from bias or assumptions that negatively impact online learners' motivations, opportunities, or accomplishments." The table below outlines the research-based equity issues that a) affect online learners and b) form the basis of Peralta's Equity Rubric (download the rubric from http://web.peralta.edu/de/equity):

Peralta Equity Rubric Criteria	Peralta Equity Rubric Description	How You Can Start Addressing This Equity Issue
E1: Technology	These days it is easy to assume that all college students a) have access to the device(s) and Internet connectivity they need to successfully complete college courses and b) know how to use technology properly.	List each technology required to complete an online course successfully; suggest alternatives for students with technology impediments or challenges; and provide clear pathways for students to get assistance with commonly required technologies.
E2: Student Resources and Support	Another common assumption is that students know where to go for help, and will do so when they need it. Further, while online course enrollment grows dramatically at most colleges, there has not been an equivalent growth in services, resources, and support that students can access at a distance.	Outline student support & well-being services in several areas, such as a) general student assistance, b) online academic supports, c) technology assistance, d) health and well-being resources, e) resources for students with disabilities. Provide pathways for students to access this support from a distance.
E3: Universal Design for Learning	One pedagogical assumption is that all learners can follow the same pathway to succeed in a given course. That pathway may involve asking all students to review all course content in just one format, or to show what they have learned in the same way.	Align course content and activities with the three core Universal Design for Learning principles (see cast.org)—multiple means of a) representation, b) action & expression, and c) engagement.
E4: Diversity and Inclusion	It is also possible to assume that students automatically know or believe that all instructors value diverse ideas and perspectives.	Create a diversity and inclusion statement for your course syllabus. Demonstrate that diverse ideas and perspectives are valued by asking students to analyze a) course content from multiple perspectives or b) how diversity fosters better learning.

Equity Rubric developed as part of the Peralta Online Equity Initiative in collaboration with Kevin Kelly, EdD



Online Equity Rubric
Version 2.0 – May 2019

	Incomplete	Aligned	Additional Exemplary Elements
E1: Technology	Technology needs aren't clear, or issues related to technology access are not addressed.	All technology required for the course is listed and described in the course syllabus; each technology is listed in the learning unit that requires it; and resources for technology help are provided where appropriate.	Offers alternatives for students with technology impediments, and clearly delineates where/how students can get assistance with required course technology.
E2: Student Resources and Support	Information about how students access online student services and support is incomplete.	Syllabus outlines student support & well-being services in, at least, these areas: a) general student assistance, b) online academic supports; c) assistance with using technology; d) health and well-being resources; and/or e) resources for students with disabilities.	In addition to outlining student support resources, there are clear explanations and pathways for online students to access and utilize all needed resources.
E3: Universal Design for Learning (UDL)	Course content and activities are not aligned to UDL principles.	Course content and activities are aligned with core principles of UDL--i.e., multiple means of representation, action & expression, and/or engagement.	Syllabus explains how and why online course content and activities are aligned with specific UDL principles.
E4: Diversity and Inclusion	Nothing present that indicates that diversity is valued in the course.	Diversity is explicitly valued in a diversity statement in the course syllabus, and at least 3 course activities require students to analyze course content from multiple perspectives.	Throughout the course, learning activities demonstrate that diverse ideas and perspectives are valued in the course, and students are challenged to analyze how diversity fosters learning.

Equity Rubric developed as part of the Peralta Online Equity Initiative in collaboration with Kevin Kelly, EdD - rev. May 2019

Peralta Community College District. (2019). https://web.peralta.edu/de/equity-initiative/equity/

Strategies That Support Students in Taking Charge of Their Own Learning

Teaching Students to Fish

1. Promote study strategies and time management skills.
2. Promote student discourse.
3. Rethink your questioning strategies.
4. Provide problems that can be solved in multiple ways.
5. Provide time for student reflection.
6. Provide timely feedback.
7. Provide explicit instruction in how to prepare for class.
8. Acknowledge effort and the value of mistakes.
9. Connect students to supports.