

Positive Classroom STEM-vironment Workshop

Presented by the Students of Being Human In STEM

Hosted by:

Hannah Braeger
Jackson Munn
Ella Spurlock

Marina Gerton
Michelle Cao



Our Goals, Inspiration, & Research:

Goals: Present our investigation about the correlation between STEM classroom environments and retention rates/diversity

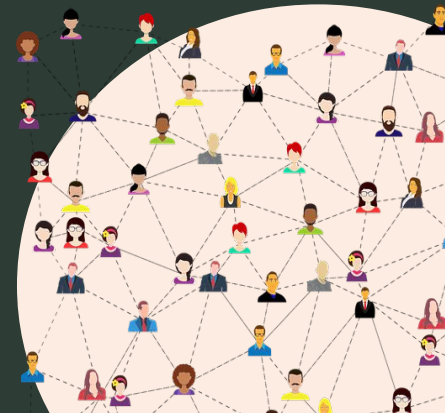
- We believe instructional teams are foundational in providing healthy, positive classroom environments
- Socio-Political structures informs us on every aspect of culture including how we learn, the content we learn, and how we are taught.
- *Identity not only belongs in STEM but is inherent in how we approach learning*

Quantitative Data: Student demographic by major publicly provided by the Office of Budget & Institutional Analysis (OBIA)

<https://www.obia.utah.edu/>

Qualitative Data: Personal stories as told by students via an informal Survey

Sent out & collected in April 2021





THE STUDENTS FROM 'BEING HUMAN
IN STEM' 2021 CLASS WOULD LOVE
TO HEAR YOUR EXPERIENCES!

“What I Wish My STEM Professor Knew”

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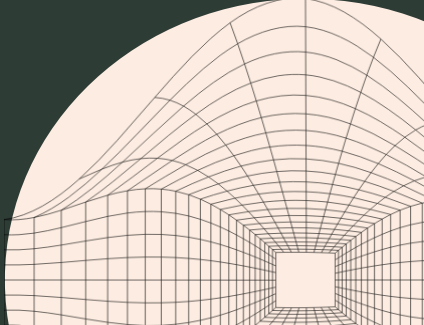
This survey was sent out in April of 2021, responses were collected up until May 2021
Respondents were asked for consent to share their words and stories either verbatim or paraphrased for this workshop.

Questions asked:

Do you identify as being an underrepresented student in STEM? If so, have you had any positive or negative experiences involving your identity? If not, have you ever seen any positive or negative classroom experiences involving another student's identity?

Have you ever experienced imposter syndrome, stereotype threat, isolation, or any other social experience at the U? If so, please describe it. How do you feel your identity or identities shape these experiences?

What experiences do you have with language in the classroom? This could include microaggressions, possibly the challenges you've faced if English is your second language (ESL), professors casually putting students down, etc. Do you have any good experiences with a professor's choice of language?



Workshop Overview

0. Introduction

I. Identity in STEM

- A. Why Identity Matters
- B. Power of Pronouns

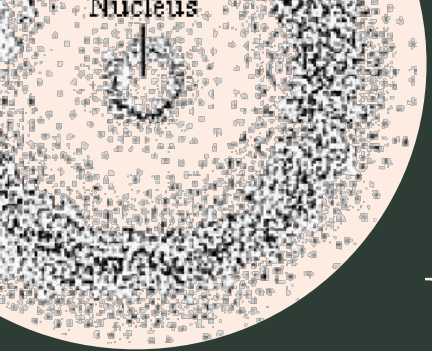
II. Learning Experience

- A. Invisible Labor
- B. Imposter Syndrome
- C. Stereotype Threat
- D. Restructuring Student Assessment

III. Language in the Classroom

- A. Language and the Environment
- B. Microaggressions

IV. Accessibility



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WHO WE ARE



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Table of Contents/Agenda

0. Introduction

I. Identity in STEM

- A. Why Identity Matters
- B. Power of Pronouns

II. The Learning Experience & Identity

- A. Invisible Labor
- B. Imposter Syndrome
- C. Stereotype Threat
- D. Restructuring Student Assessment

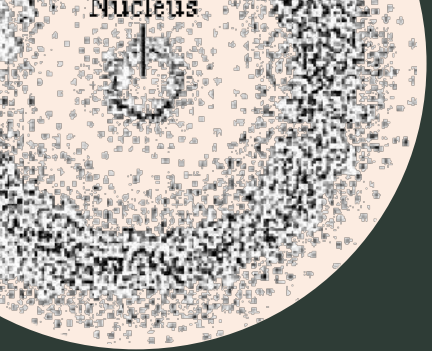
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Disclaimer

This workshop has been created by students, and even more significantly by humans. We are not infallible in our knowledge and we are open to different interpretations. Our content is entirely built on a student viewpoint that is not generalized across the student body. We understand there are plenty of grey areas and surrounding language that have different associated personal preferences or connotations. We are mindful about these viewpoints and intentional in our language use.



Identity in STEM



Why is Identity Important?

For STEM success, students must be able to picture themselves in their chosen careers

(i.e. as scientists, engineers, mathematicians, software developers, etc)

If they do not see their identities represented in STEM, that becomes much harder.

NOTE: Identity is fluid

Some Common Identities Important to Students

- Gender Identity
- Race
- Ethnicity
- Sexuality
- Socioeconomic Class
- Age
- Marital Status
- Veteran Status
- Ability/Disability Status
- Religion
- Immigration status
- National Origin
- Student Status [Full time, first gen, etc]
- and many more

Example: The Power of Pronouns

Pronouns are a powerful way for a person to express and live their gender identity.

Examples:

- she/her/hers
- they/them/theirs
- he/him/his
- zie/zir or others

When in doubt, you can always default to a person's name!

Example: The Power of Pronouns

A Quick Guide to They/Them Pronouns

Singular they:

"They" is a pronoun, just like she/her/hers and he/him/his.



They/them/theirs can be used for someone like she and he.



Eg. They walked to the park.

@the.rainbow.spectrum

Remember!

*The person you're referring to when using they/them/their is singular.

*Grammar rules still apply. You would say "they are" instead of "they is", even though you're talking about a singular person.

@the.rainbow.spectrum

Example:

Kai is my friend. They are really kind. They love Star Wars. I really like them since we have so much in common. By the way, they gave me their Star Wars poster as a gift. I can't wait for you to meet them!

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Underrepresented Student Definition

“Any student who identifies with a group that has a noticeably low participation in a field.”

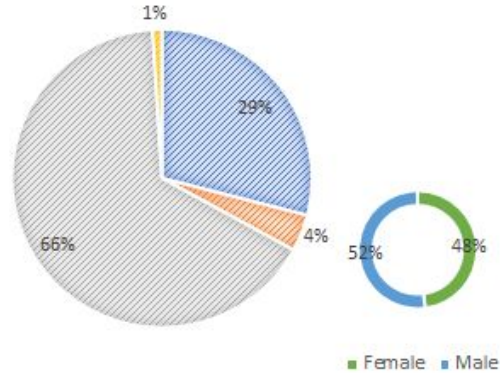
Note: this is PERSONAL and SUBJECTIVE based on the field in question.

Identity Statistics for U of U STEM Students

The Office of Budget & Institutional Analysis

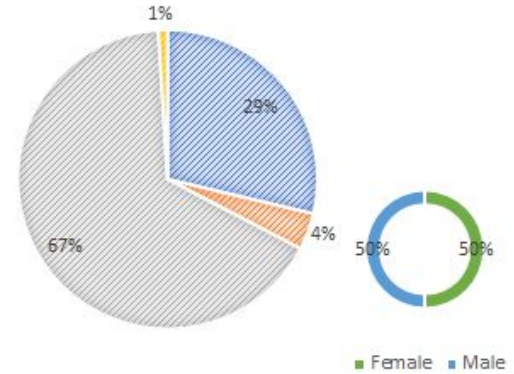
UNIVERSITY TOTAL

■ Domestic Students of Color ■ International ■ White ■ Unknown



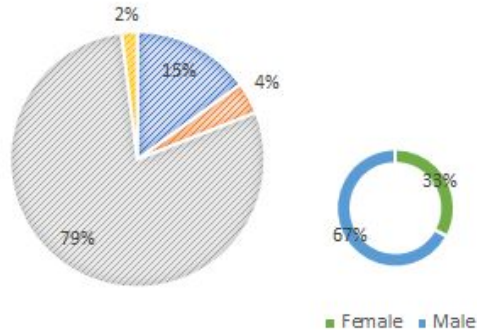
COLLEGE OF SCIENCE

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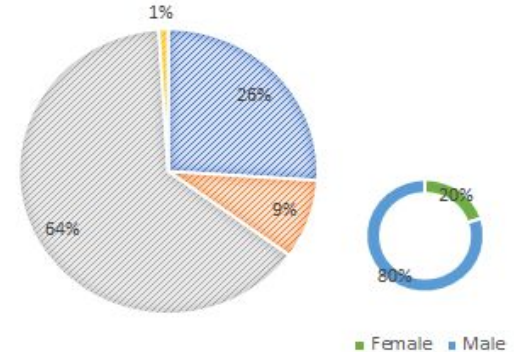
COLLEGE OF MINES AND EARTH SCIENCES

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COLLEGE OF ENGINEERING

■ Domestic Students of Color ■ International ■ White ■ Unknown



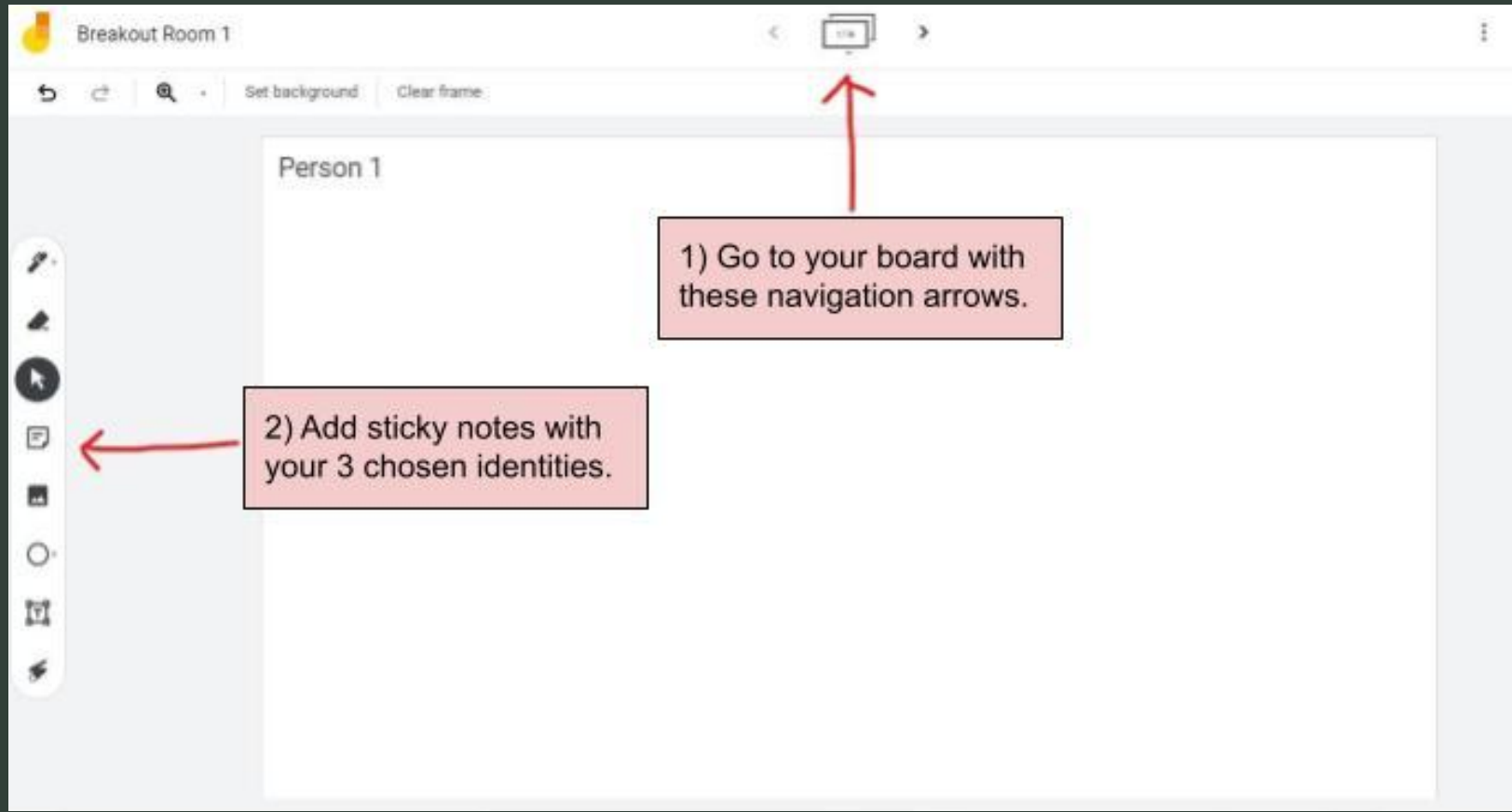
ACTIVITY: Personal Identities

Write or type as many identities as pertain to you in 2 minutes.

- (Professor, Sibling, rockclimber, lesbian, white, etc)

Choose 3 identities that you feel best describe you.

ACTIVITY: Personal Identities



Breakout Room 1

Set background Clear frame

Person 1

1) Go to your board with these navigation arrows.

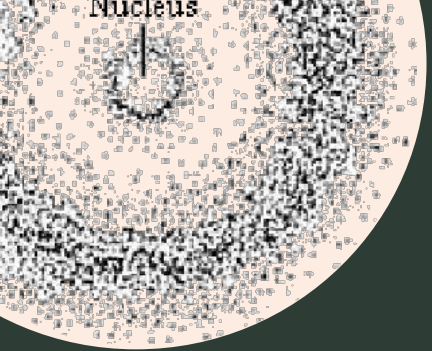
2) Add sticky notes with your 3 chosen identities.

The screenshot shows a digital workspace titled "Breakout Room 1". At the top, there are navigation arrows (left and right) and a central icon of a board with a "1/18" label. Below this, there are buttons for "Set background" and "Clear frame". The main area is a white board with the text "Person 1" at the top left. On the left side of the board, there is a vertical toolbar with various icons. A red arrow points from a text box to the navigation arrows at the top, and another red arrow points from a text box to the sticky notes icon in the toolbar.

ACTIVITY: Personal Identities

Breakout Rooms:

1. Assign numbers to everyone in your group in alphabetical order
 - a. Ex: *Abdel = Person 1; Erika = Person 2; Maria = Person 3*
2. On the Google Doc, click the Jamboard link for your assigned breakout room.
3. Go to the Jamboard page associated with your assigned number and create “sticky notes” for your 3 chosen identities.
 - a. Ex: *Abdel writes on page 1; Erika writes on page 2; Maria writes on page 3*
4. Look at the page of the group member with a number one more than yours (or number 1 if you are the last number) and choose one note.
 - a. Ex: *Abdel looks at Erika’s page; Erika looks at Maria’s page; Maria looks at Abdel’s page*
5. Reflection and discussion. How did that make you feel?



Identity and Learning Experiences





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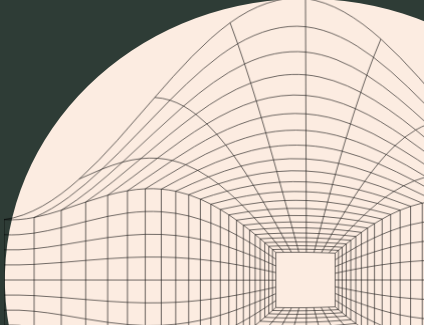
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“I never feel like I am on par with the rest of my classmates, like I just keep getting lucky with exam problems and that's why I'm passing. I never feel confident to share in class or to apply for certain things such as research positions or scholarships. Sometimes it's hard to see myself doing these things and belonging when almost everyone I see and look up to (i.e professors, lab TAs) are men, or white women.”

Major: Chemistry

“I don't see very much representation of nonbinary people in STEM and that is really discouraging to me. It has definitely gotten better the more I have learned about it and understood what role it plays in my feelings about myself. Understanding it helps me combat it.”

Major: Physics

“My age makes it harder for me to feel like I belong. If [I] wasn't ‘good enough’ when I was younger what makes me good enough now?”

Major: Chemistry

“I refuse to even hint at my identity as a gay man to 99.9% of my peers and professors. In fact, I oftentimes lie about my sexual orientation to make myself appear as if I'm heterosexual. I feel that if I am associated with the stereotypes of gay men... that I won't be taken seriously if I hope to get job opportunities..., try to join a research lab, or even give a research presentation to a class. I hope to find more STEM classes where I feel SAFE to be my authentic self to everyone WITHOUT the fear of these possible repercussions.”

Major: Pre-medical Laboratory Science

Connecting Identity With Learning Experience

Invisible Labor

Hidden work or unseen efforts (things you can't put on your CV) generally characterized by emotional labor

Examples:

- Creating access in areas of limited accessibility:
 - Spending extra time on material because of cognitive & mental disability, physically accessing classrooms, transcribing the instructor's presentation of material
- Navigating social context: protests, policies that affect identities
- Mentoring others in navigating the above list (tokenism)
- Proving self worth in environments where identities are underrepresented

Connecting Identity With Learning Experience

Imposter Syndrome

- First coined by Pauline Rose Clance and Suzanne Imes in 1978
- Many people's feelings characterized by:
 - Isolation
 - Self Doubt
 - Not Belonging, Unwelcomed
- Produced by underrepresentation amongst peers, staff, & faculty

Our Take

- Solutions generally revolve around individual responses
 - Ex. self affirmations, talking openly about your experiences, etc.
- What can we really do as a community?
- Why does imposter syndrome directly affect students with diverse backgrounds?
- What perpetuates Imposter syndrome?

Connecting Identity With Learning Experience

Stereotype Threat

- Put your (virtual) thumb up if you've ever experienced stereotype threat
- Stereotype threat coined by Claude Steele in 2010
 - When individuals have a fear of conforming to negative stereotypes ascribed to the social group they identify with
- Stereotypes not the same as identity
- Low academic performance, enhanced by common assessment practices
- When stereotypes go unacknowledged, students perform better due to reduced probability of triggering the threat
- Increasing visibility of stereotyped groups reduces the threat itself

Connecting Identity With Learning Experience

Assessments

- Stereotype threat factors into how students perform on exams
 - Even the way an assessment is discussed in class can trigger stereotype threat
- Need to move away from the idea of 'knowledge' in favor of 'understanding'
- Utilize questions that are representative of diverse group of people (using different pronouns, for example)
- Restructure exam format (group exams, reflections, progress checks, etc.)
- Consider using other forms of assessment (projects, papers, etc.)
- Consider different grading formats (effort-based, improvement-based, no curve, etc.)

ACTIVITY

Pre-modification examples

Draw and label the first three intermediates of glycolysis, and note the associated enzymes.

Describe the protocol used to select master and slave processes in a distributed system.

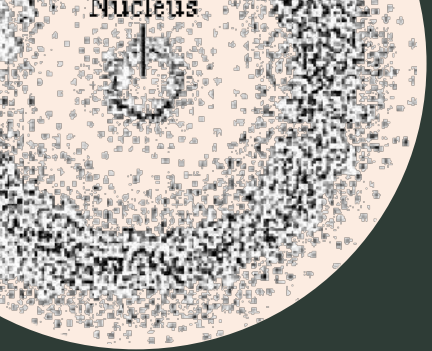
Bill and Dave walked from their separate apartments and met up at a coffee shop before heading home. They want to calculate their average speeds since leaving their apartments until returning. Show how they can do this.

Post-modification examples

Discuss the biological significance of the intermediates and their structural differences.

Describe the protocol used to select controlling and controlled processes in a distributed system.

Youlhee and Jo walked from their separate apartments and met up at a coffee shop before heading home. They want to calculate their total average speeds. Explain at least two ways this can be done.



Language and Identity In The
Classroom



Microaggressions

What They are and Why they Matter

What Are Microaggressions?

- Brief, everyday experiences
- Subtle criticism of others
- Discrimination based on affiliation with a group.
- Can be done on purpose, or inadvertently
- Can be verbal or physical
- Being excluded in general

Why do Microaggressions Matter?

In context of the University/learning environment:

- Increases stress level of recipient.
- Individuals forced to accept or reject given microaggression.
- Affects cognitive thinking, behaviors, and biological abilities.
- Can potentially hinder students' success in college.
- Contributes to Imposter Syndrome
- Decreases persistence of STEM careers

Limit Microaggressions in the Classroom

Instructional Level:

- General Phrasing, instead of dismissing look for inclusivity
- Asking oneself these questions prior to instruction:
 - “Would this phrase have a negative effect on students?”
 - “What ramifications does this phrase have?”
- Be careful about being “blunt” in phrasing

Classroom Level:

- Encourage inclusive language in classroom discussions
- Create clear boundaries of what is considered “out of bounds” language
- Encourage anonymous student feedback

Examples in the Classroom...

Why is this a Microaggression?

A professor teaching a math class demonstrates how to solve most of a complicated math problem, showing work on a board; however, towards the end of the problem the professor stops and says “**The rest is just algebra.**”

Why is this a Microaggression?

“I have a professor who say that something along the lines of **‘This is the hardest class you will ever take’** and that is very discouraging to me and many other students.”

Why is this a Microaggression?

“I hate when my professors assume that everyone is heterosexual. I remember when I was learning about and asking for help understanding meiosis (not at the U, but in Utah) that the professor started with **‘It starts when you have sex with your girlfriend...’**. Because this is not an experience I have, will, or want to have, it makes me feel not as welcomed into the classroom knowing that the language the professor uses enforces the heterosexual normative which makes it harder for me, a gay man, to meld in with and be fully accepted by society in general.”

Why is this a Microaggression?

“ ‘**This is easy...**’ preceding any sentence can be very invalidating to students who find themselves struggling to understand a new concept. ‘**Come on, I know you know this....**’ can be similarly invalidating when said in frustration after a professor's general question to a class is left unanswered.”

Why is this a Microaggression?

“My physics teacher likes to casually tell all of the class that we need to ‘**get fluent**’ in the material. He says that if we don't understand something, we just need to get fluent. He does nothing to help us understand the material and his words seem harsh coming from a man who doesn't seem to care about the wellbeing of his students.”

Now do your best to apply what you have
learned!

Exit

Please take our survey to let us know what you thought about the workshop and stay connected with us!

<https://forms.gle/hL7keqnSXXKipsyBJA>

We're planning a second workshop before fall semester, please let us know if you're interested in attending.

Contact Us: Questions and Interest



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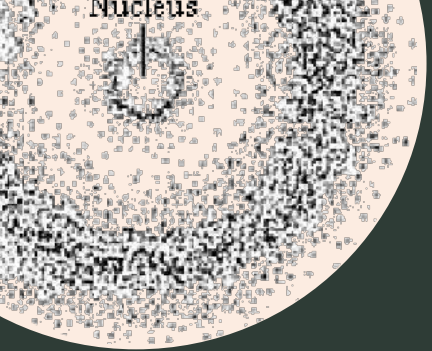
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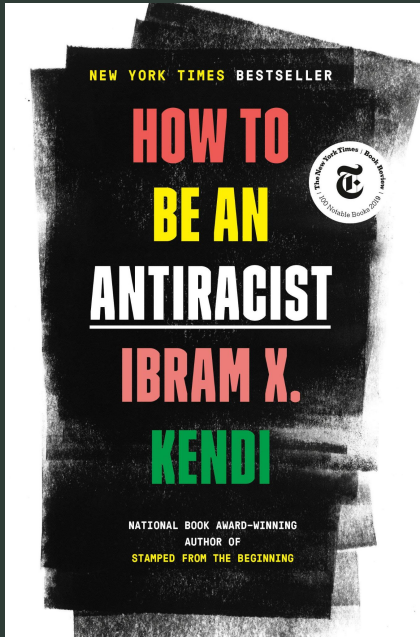


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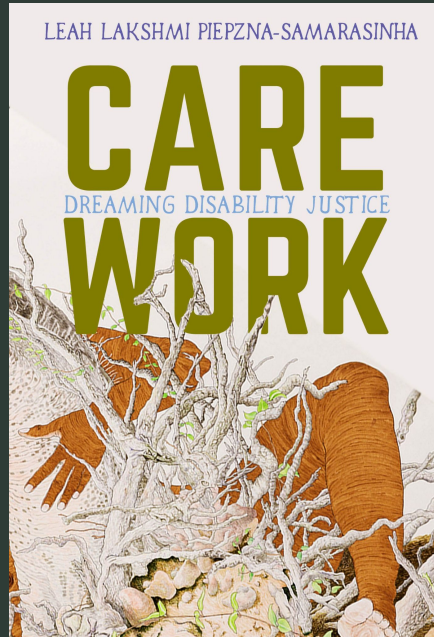


To Be Continued...

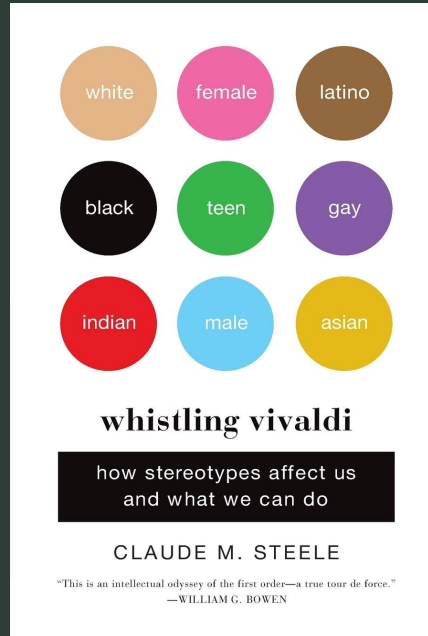
Literature



Ibram X. Kendi on Black Experience, Racism at large
How to be An Antiracist



Leah Lakshmi Piepzna-Samarasinha on disability as trans/inter-disciplinary social justice work
Care Work: Dreaming Disability Justice



Claude Steele on the effects of stereotypes
Whistling Vivaldi: How Stereotypes Affect Us and What We Can Do



bell hooks on teaching pedagogies and educational practices (from top left, top right, to bottom)
Teaching To Transgress: Education as a Practice of Freedom
Teaching Critical Thinking: Practical Wisdom
Teaching Community: A Pedagogy of Hope

Bibliography

- Clance, Pauline Rose; Imes, Suzanne. *The Imposter Phenomenon in High Achieving Women: Dynamics and Therapeutic Intervention*. Psychotherapy Theory, Research and Practice, 1978.
- hooks, bell. *Teaching Community: A Pedagogy Of Hope*. New York: Routledge, 2003.
- Hurtado, Sylvia; Sork, Victoria L. *Enhancing Student Success and Building Inclusive Classrooms at UCLA*. Report to the Executive Vice Chancellor and Provost, December 2015.
- Kendi, Ibram X. *How to Be an Antiracist*. New York: One World, 2019. Print.
- “Our Inclusive Curriculum.” *Equality, Diversity and Inclusion - Kingston University London*, Kingston University, 2018, www.kingston.ac.uk/aboutkingstonuniversity/equality-diversity-and-inclusion/our-inclusive-curriculum/.
- Parkman, Anna. *The Imposter Phenomenon in Higher Education: Incidence and Impact*. Journal of Higher Education Theory and Practice, 2016.
- Rucks-Ahidiana, Zawadi. “The Inequities of the Tenure-Track System”. *Inside Higher Ed*, 7 June 2019.
- Sengupta-Irving, Tessa; Tunney, Jessica; Macias, Meghan. *Stories of Garlic, Butter, and Ceviche: Racial-Ideological Micro-Contestation and Microaggressions in Secondary STEM Professional Development*. Cognition and Instruction, 2020.
- Shepard, Lorrie A. *Learning theory supports four effective strategies common to both formative assessment and scaffolding*. Assessment to Promote Learning, 2005.
- Steele, Claude. *Whistling Vivaldi : And Other Clues to How Stereotypes Affect Us*. New York :W.W. Norton & Company, 2010.
- “The Office of Budget & Institutional Analysis.” *University of Utah’s Source of Information*, University of Utah. 2021, <https://www.obia.utah.edu/>
- Tulshyan, Ruchika and Burey, Jodi-Ann. *Stop Telling Women They Have Imposter Syndrome*. Harvard Business Review, February 2021.

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