Foothill College
STEM Division Check In

A Hippocratic Oath for Teachers: First do no harm

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Foothill College
Friday June 23, 2023
1pm - 2pm (PST: UTC-8) via Zoom

The Status Quo is Unacceptable

What would I say about a company who designs a car that kills more than 60% of it's drivers?

The Status Quo is Unacceptable

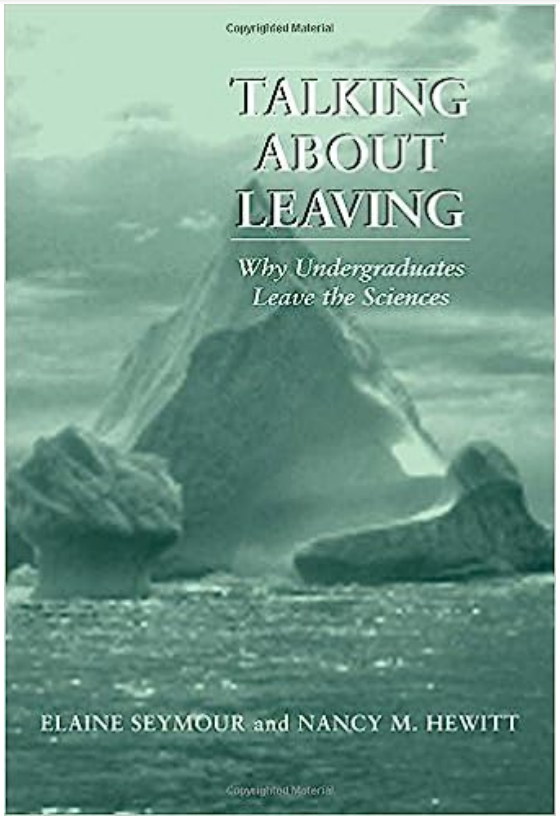
Executive Office of the President

The President's Council of Advisors on Science and Technology

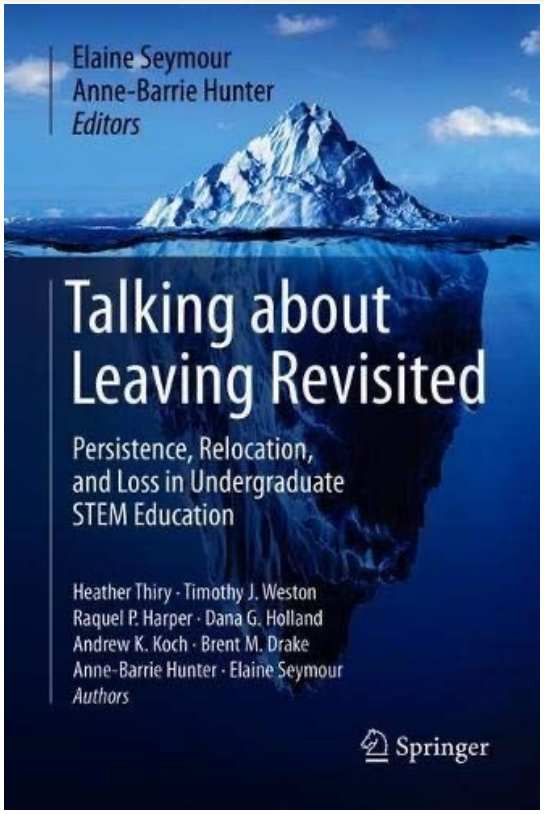
"Fewer than 40 percent of students who enter college intending to major in a STEM field complete college with a STEM degree."

-2012 Report for the President's Council of Advisors on Science and Technology (PCAST), Engage to Excel: Producing One Million Additional College Graduate with degrees in STEM

The Status Quo is Unacceptable



1997 - Documents the reasons so many students decide to leave STEM fields



2019 - Documents the reasons so many students decide to leave STEM fields

The Status Quo is Unacceptable

Year	Source	Persistence, Relocation, and Loss in Undergraduate STEM Education
2019	Talking about leaving Revisited	Only 40 – 50% of students who enter College intending to major in STEM fields complete a degree in a STEM Major
1997	Talking about Leaving	Switching rates for students who enter college in 1987: English: 15% Soc Sci, Poli Sci, Arts, Hist, Edu: 28 – 35% Sciences, Comp Sci, Math: 47% - 63%

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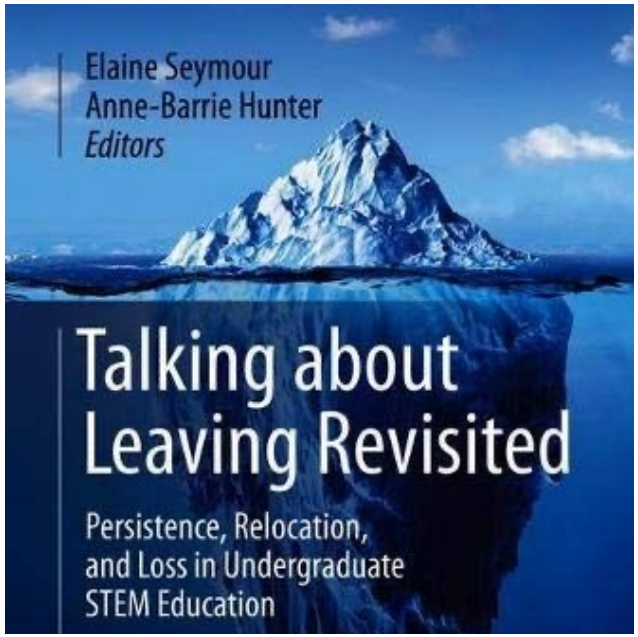

In many college STEM classes, “there is content overload, incoherent presentations, curve grading, with material pitched too high and inappropriately abstract, a focus on rote learning and boring delivery”

-Talking about Leaving Revisited

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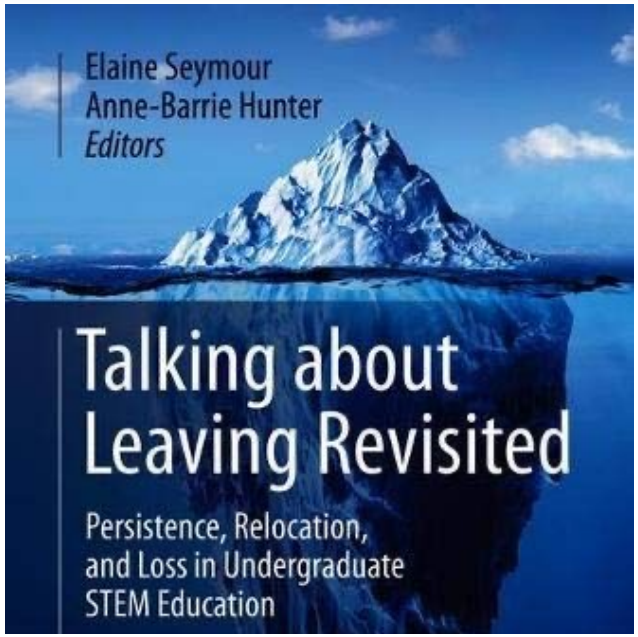

"The evidence presented here is damning..." as it documents a "structured intentionality of the weed-out system to get rid of a higher proportion of [students] rather than teach them."

-Talking about Leaving Revisited

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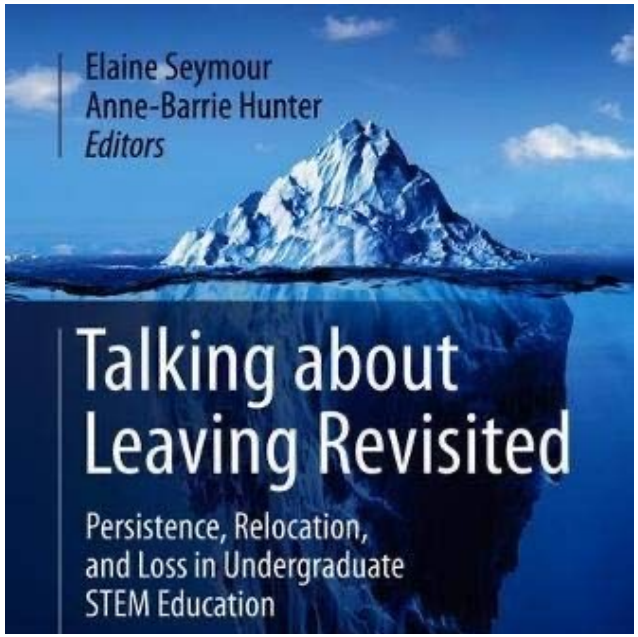


"Complicity of poor teaching by faculty and... neglect by institutions to declare the losses as unacceptable."

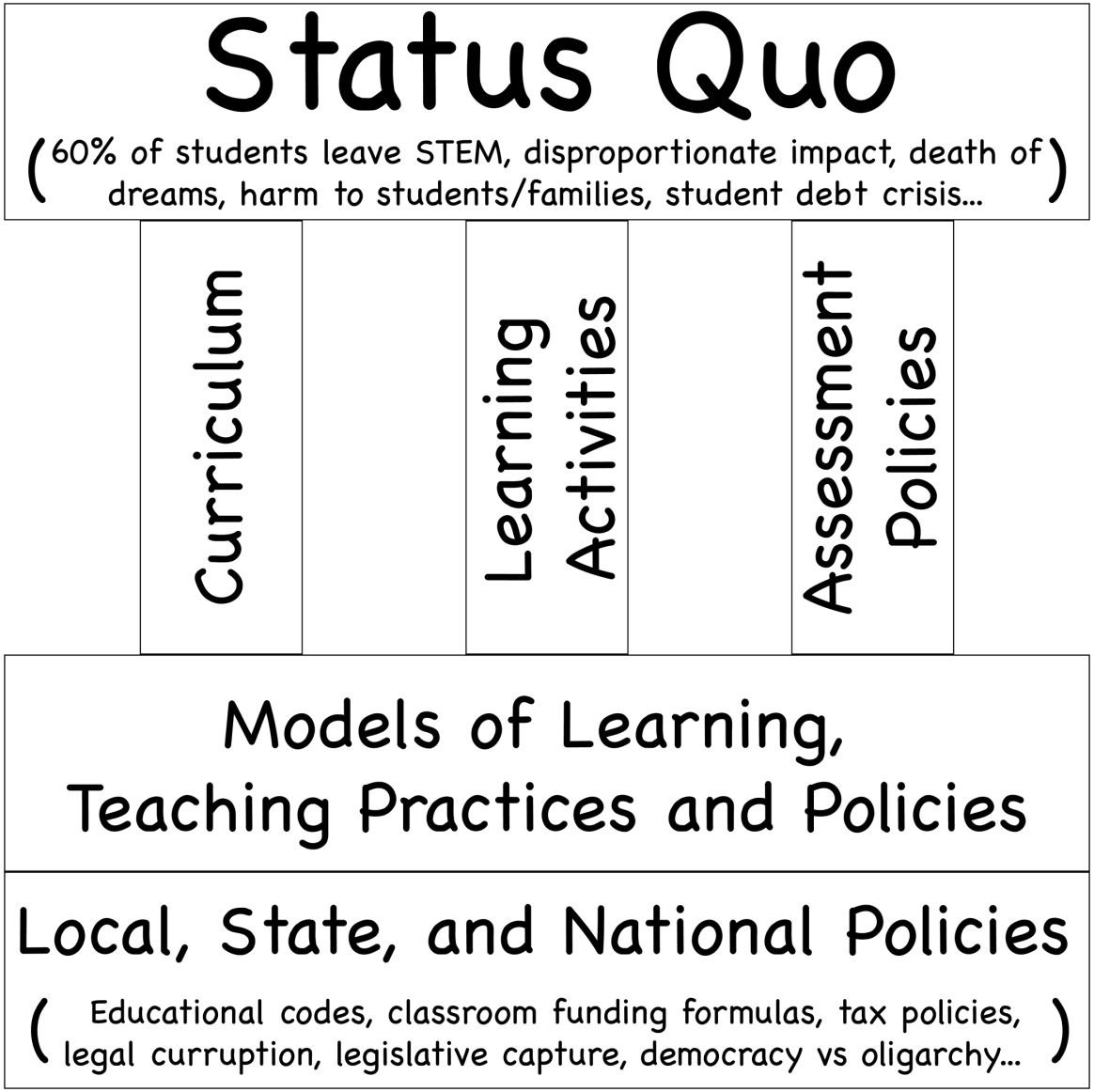
-Talking about Leaving Revisited

The Status Quo is Unacceptable

When I show up as a college STEM teacher, do I maintain the status quo?

How many of the teaching decisions that I make in my classrooms reflect my own experiences in college?

The Status Quo Is Designed to Do Harm



The Status Quo Is Designed to Do Harm

"Roger Schank has often said,

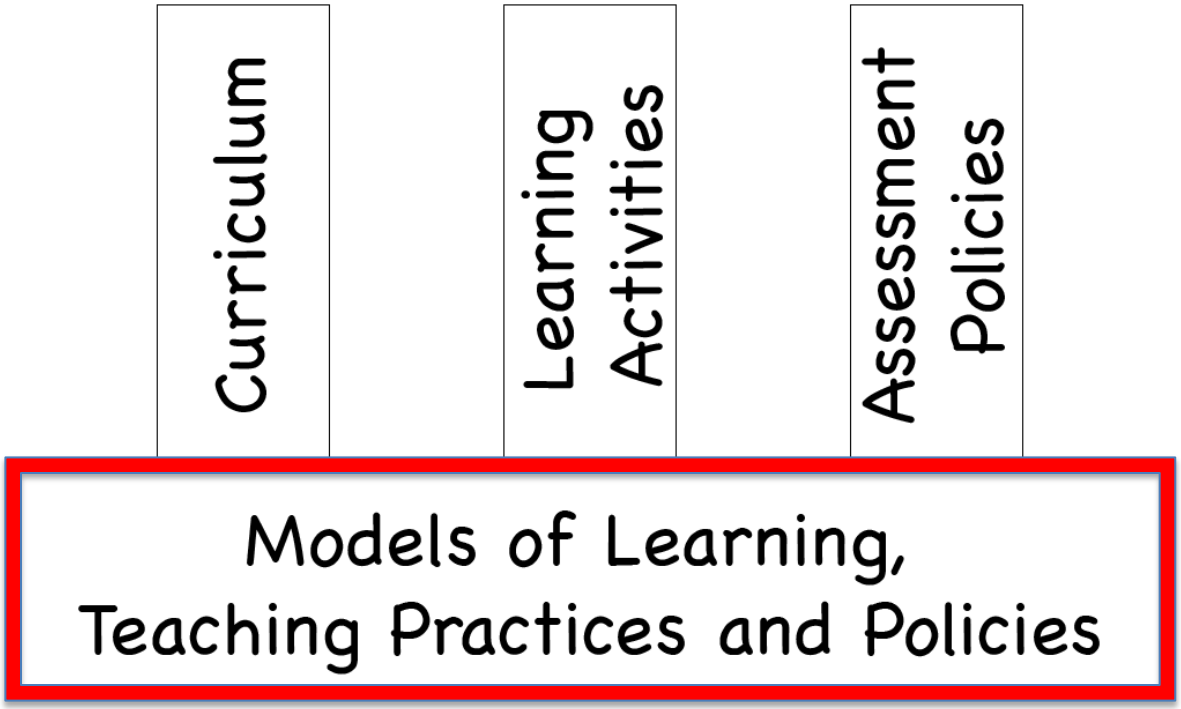
'There are only two things wrong with education: what we teach, and how we teach it.'

Getting rid of grades is an important part of fixing the *how*, but it's important not to lose sight of the *what*."

-Ungrading: Why Rating Students Undermines Learning, Edited by Susan Bloom, Chapter 8: by Christopher Riesbeck, pp. 135

How to Challenge the Status Quo

Stage 1A: Research (2010 – present)

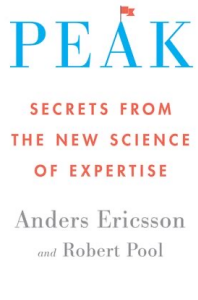


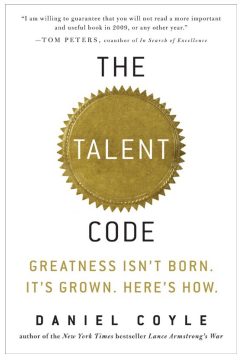
How to Challenge the Status Quo

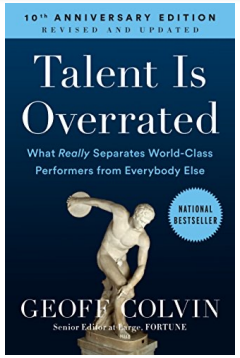
"It is important to understand that practice does rest on theory, whether or not that theory has been explicitly identified. The overwhelming majority of teachers, according to one survey, are unable to name or describe a theory of learning that underlies what they do in the classroom, but what they do - what any of us does - is no less informed by theoretical assumptions just because these assumptions are invisible."

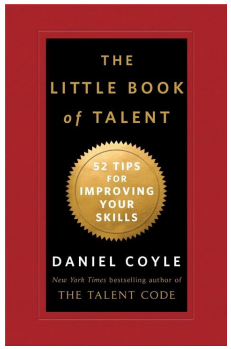
-Alfie Kohn, Punished by Rewards: The Trouble with Gold Stars, Incentive Plans, As, Praise, and Other Bribes, p. 10

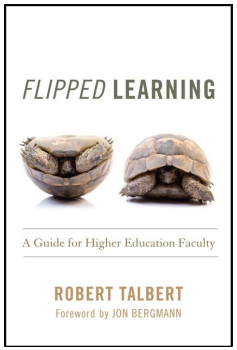
Research to Challenge the Status Quo

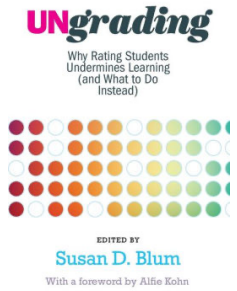


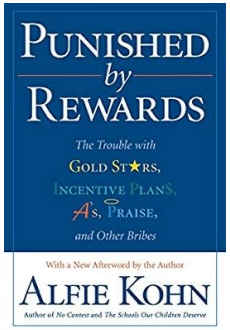


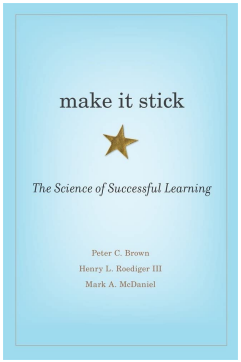


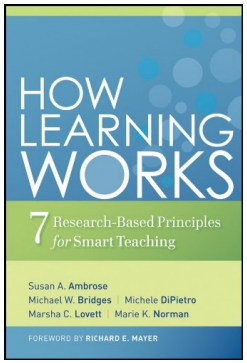


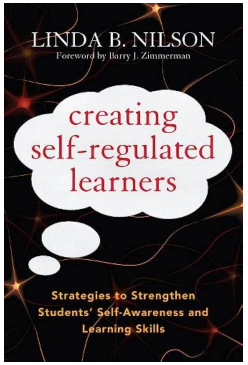


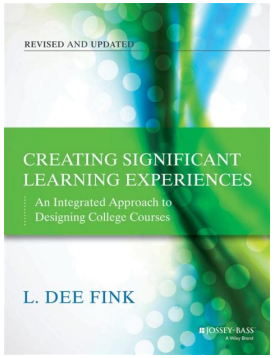


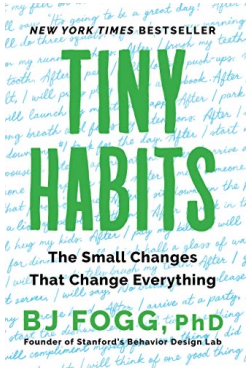


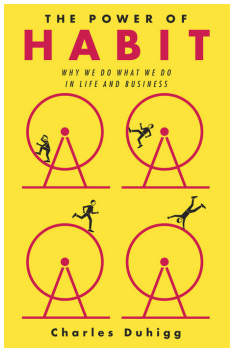


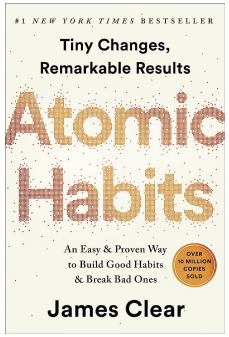












https://thelearningcode.school.blog/2020/12/11/what-is-deep-reading/
https://jeffandersonmath.wordpress.com/2022/01/02/essential-ungrading-reading-lists/
https://jeffandersonmath.wordpress.com/2022/12/13/40-books-to-enhance-and-deepen-your-college-education/
https://jeffandersonmath.wordpress.com/2023/05/05/my-anti-racist-reading-list/

Research to Challenge the Status Quo

Let's define *learning* as a *growth process* that happens inside your body and leads to *changes* in your knowledge, beliefs, behaviors, or attitudes. These transformations occur based on your experiences and increase your potential for improved performance and future learning

https://thelearningcode.school.blog/2021/01/24/what-is-deep-learning/

Research to Challenge the Status Quo

Let's define *deep learning* to be learning that involves an intense, distraction-free focus on growing your abilities by pushing beyond the limits of your current capacity. When you engage in deep learning, you actively reach for and repeat skills that you want to build by paying extra special attention to your performance during each repetition.

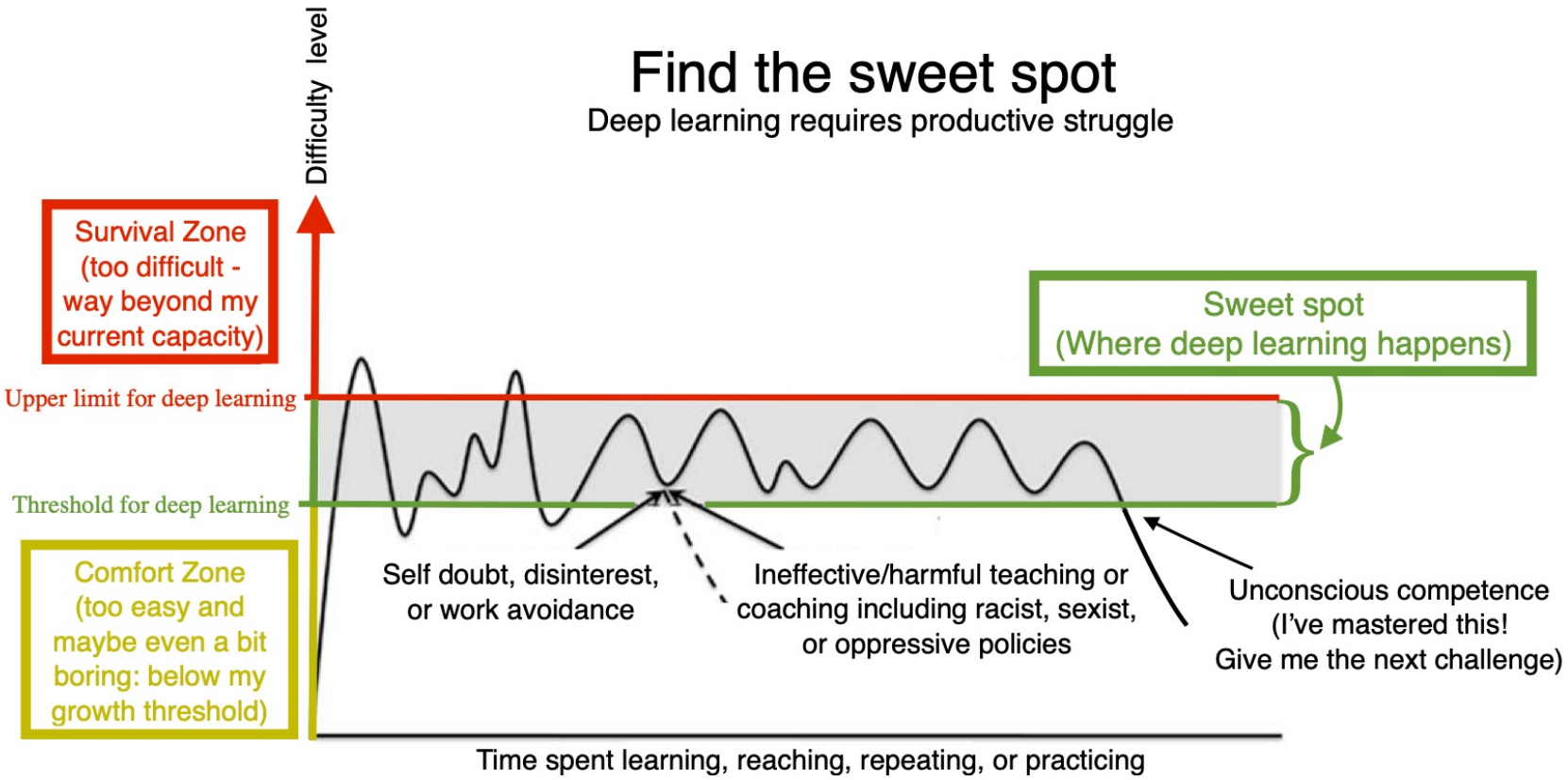
https://thelearningcode.school.blog/2021/01/24/what-is-deep-learning/

Research to Challenge the Status Quo

S*hallow learning* is the opposite of deep learning. Shallow learning involves a modest level of focus or lacks the intensity and duration required for deep learning. When you learn in a shallow way, you probably do not have a clear vision for how or why this learning is important to you. You may also be unwilling or unable to leave your current comfort zone or to reach for goals on the outer edge of your ability. Shallow learning involves a distaste for mistakes and a desire to avoid making or identifying errors.

https://thelearningcode.school.blog/2021/01/24/what-is-deep-learning/

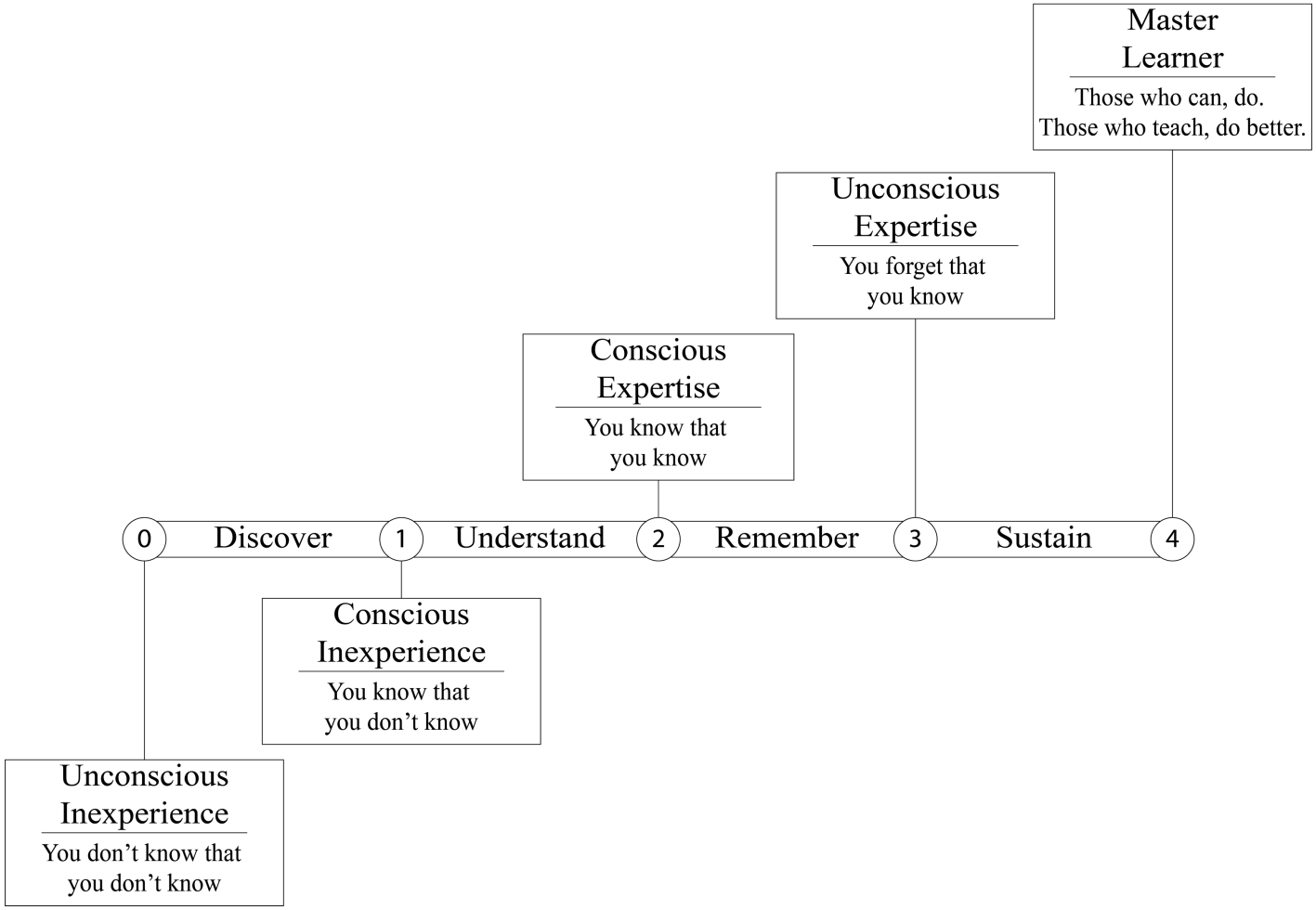
Research to Challenge the Status Quo



https://thelearningcode.school.blog/2021/01/24/what-is-deep-learning/
https://thelearningcode.school.blog/2021/03/07/a-model-for-deep-learning/

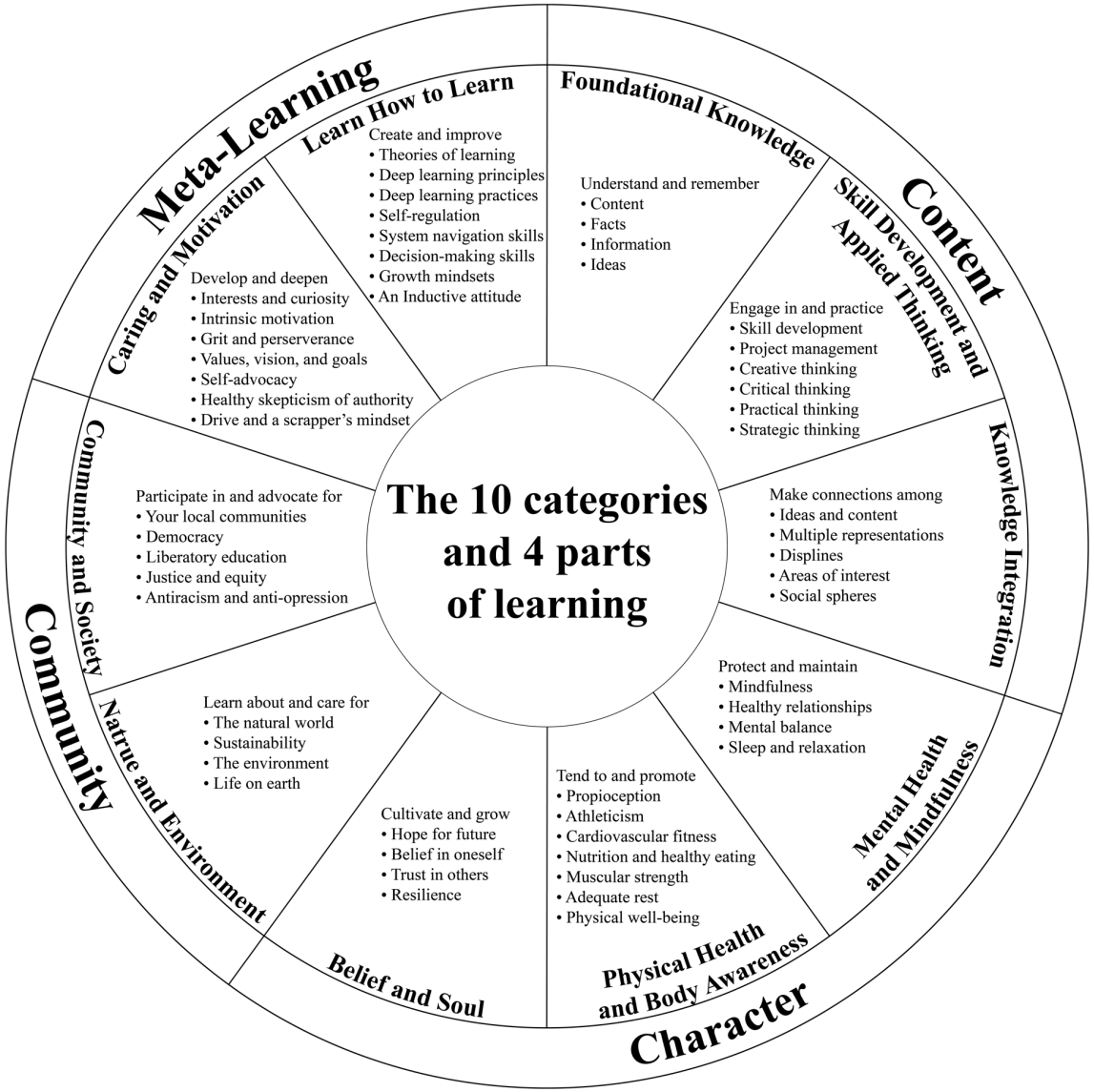
Research to Challenge the Status Quo

The Stages of Deep Learning



https://thelearningcode.school.blog/2021/04/18/the-five-stages-of-deep-learning/
https://thelearningcode.school.blog/2021/05/09/progress-through-the-five-stages-of-deep-learning/

Research to Challenge the Status Quo



https://thelearningcode.school.blog/2021/09/30/make-learning-meaningful-what-is-foundational-knowledge/

Research to Challenge the Status Quo

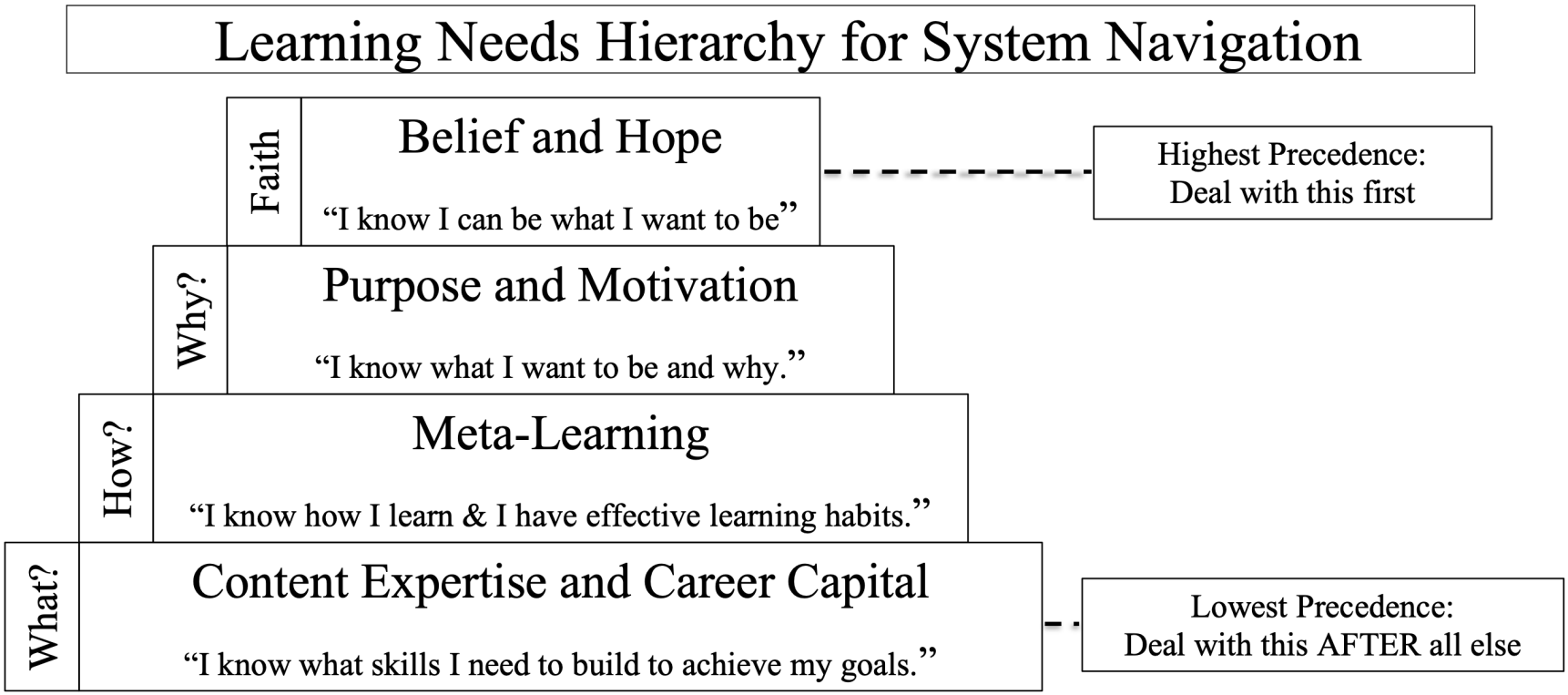
Teaching is the act of facilitating, inspiring, encouraging, supporting, and empowering learning. In other words, a teacher is someone who stimulates learning. If no learning is happening, than no teaching has happened regardless of the effort / intention of the teacher.

Learning is something that happens inside the brain of an individual student. To teach, we must be able to impact learning for each individual student that we work with. There is no such thing as teaching a class. Instead, for every single student that a teacher works with, we must ask: is that student learning in significant ways?

Once we start thinking about individual students who have a life-time worth of experiences, memories, and previous learning, we must realize that teaching happens within a social context. Thus, a major part of the work of a teacher is about creating an environment that helps students learn and liberates students from larger structures of oppression that might block, impede, or constrain their learning.

https://jeffandersonmath.wordpress.com/2023/03/17/how-do-we-teach-about-race-in-college-stem-classes/

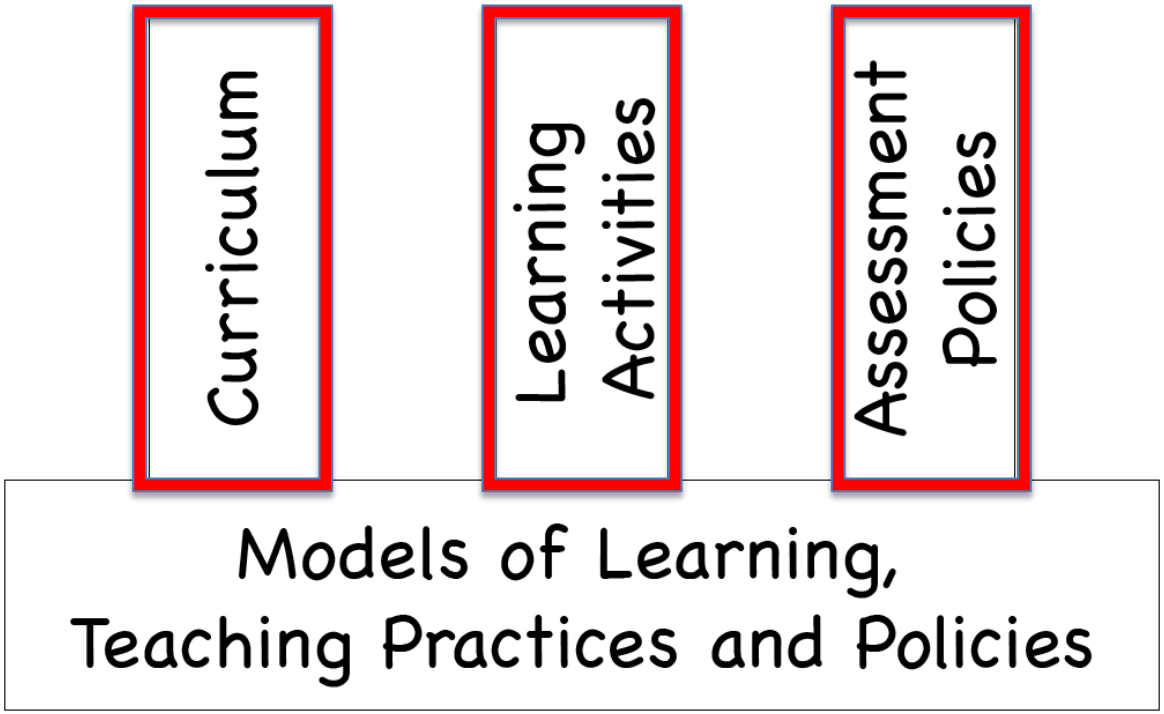
Research to Challenge the Status Quo



https://jeffandersonmath.wordpress.com/2023/03/15/five-research-based-learner-centered-learning-objectives-for-college-students/

How to Challenge the Status Quo

Stage 1B: Development (2013 – present)



Development to Challenge the Status Quo

Curriculum:

- I write my own textbooks that I give away for free.
- For each textbook, I create a text-based version and also translate those into YouTube videos that my students have access to.
- I incorporate research-based principles into the design of my textbooks.
- I also develop applied projects that relate to students academic and career interests that provide students with tangible experiences to give an intellectual need for the theory in my classes.

Development to Challenge the Status Quo

Learning activities:

- Flipped learning structure
- Active learning on applied projects
- Collaborative, team-based learning in small groups
- Heavy focus on meta-learning: Conquering College, Get Paid to Learn, From the Classroom to the Bank
- Bi-weekly one-on-one learning conferences with me (the teacher) for feedback and guidance

Development to Challenge the Status Quo

Assessment Policies:

- Ungrading processes
- Students engage in learning reflections
- Peer-to-peer dialogic andragogy where students are part of the teaching team
- Assessment towards self-directed learning, critical consciousness, and system transformation

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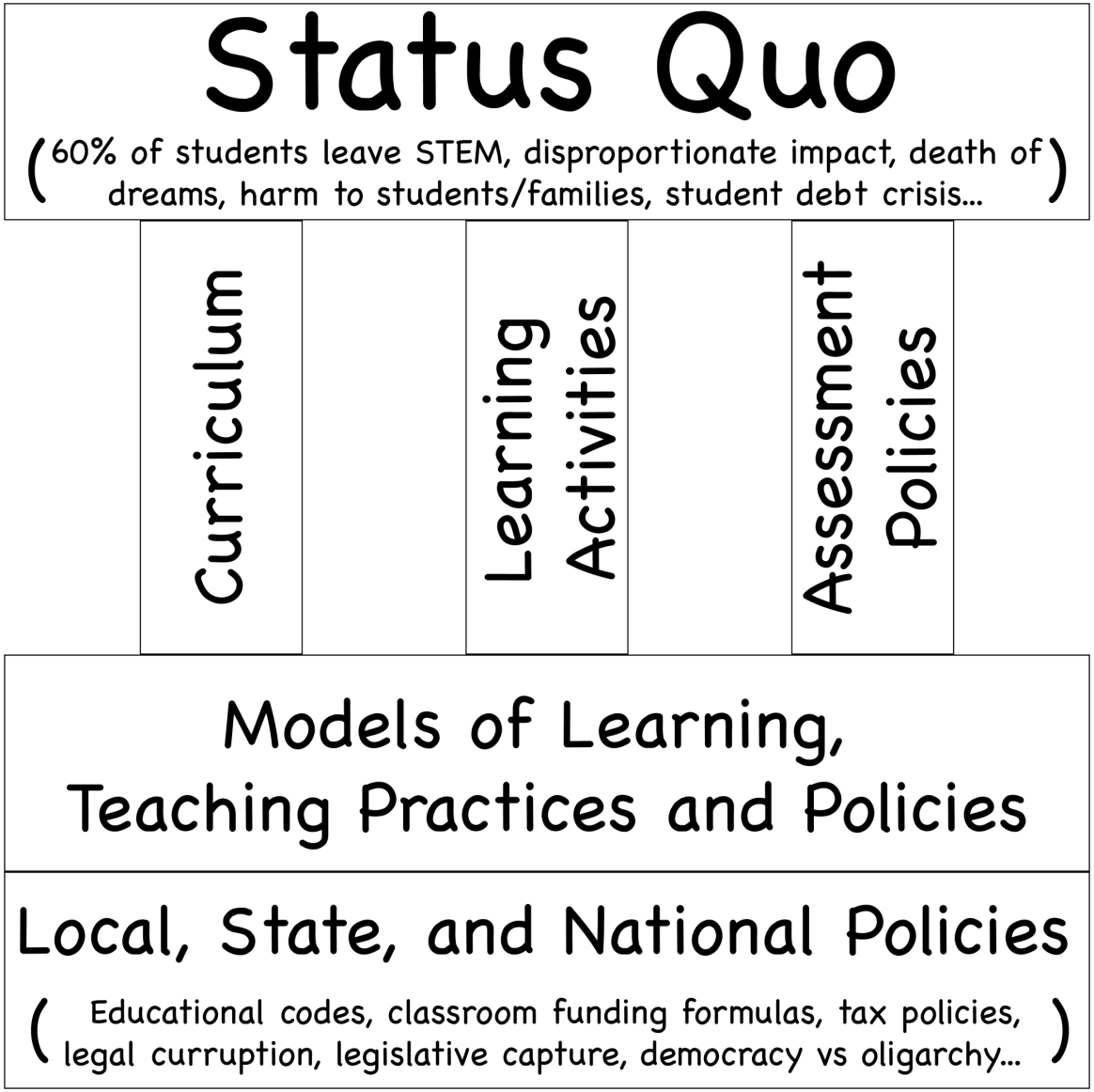

How You Can Challenge the Status Quo

- Read… A lot.
- Develop your own research-based definitions and models for what learning is and how learning works.
- Develop your own research-based, antiracist definition for what teaching is. Use that definition to develop practices and policies that support your work as a teacher.
- STOP using the same teaching techniques you experienced in college (lectures, timed exams, letter grades, homework, high-cost textbooks, etc).
- Commit the rest of your career to transforming your classroom systems by getting 1% better everyday.

How You Can Challenge the Status Quo

- Find other people who want to engage in challenging the status quo. Then, build meaningful relationships with these people.

- Pull the levers of power at your local institution to make it easier to do transformative work. This implies dedicating resources, time, and energy to interrupt the status quo.

- Work together to build grass-roots awareness, energy, and advocacy teams to change local, state, and national policies to address the elephant in the room.

More about my work

Content for a nonfiction book on practices/policies to radically transform STEM education
https://www.appliedlinearalgebra.com/blog/jeff-anderson-math-blog-posts
https://www.appliedlinearalgebra.com/blog/jeffs-tlc-blog-posts
https://jeffandersonmath.wordpress.com/2022/11/02/lets-re-imagine-undergraduate-math-education/
https://jeffandersonmath.wordpress.com/2022/12/02/some-research-behind-my-push-to-re-imagine-college-math-education/

Linear Algebra (Math 2B) and MATLAB (Engr 11) Textbook Projects Work
https://jeffandersonmath.wordpress.com/2023/03/08/jeff-andersons-applied-linear-algebra-fundamentals-textbook-project/
http://www.appliedlinearalgebra.com/blog/for-teachers/linear-algebra-laboratory-exercises
https://www.appliedlinearalgebra.com/blog/for-students/welcome-to-math-2b
https://www.appliedlinearalgebra.com/blog/for-students/welcome-to-engr-11

Content for a nonfiction book to help students grow their Meta-Learning skills
Conquering College Lab 1: Schedule to Succeed
Conquering College Lab 2: Prepare for Deep Learning
Conquering College Lab 3: Prepare for Flipped Learning
Conquering College Lab 4: Create Your Dream Binder
Conquering College Homepage