

The *Work* of Project-based Learning In the Age of Educational Reproduction

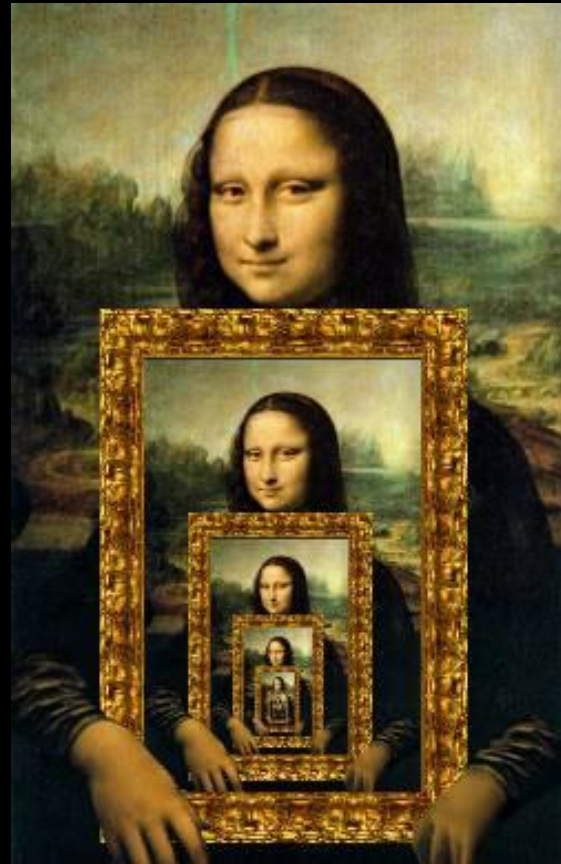


**Randy Bass
(Georgetown University)**

**WPI Project-based Learning
Institute
June 17, 2021**

Walter Benjamin

The work of art in the age of mechanical reproduction (1935).

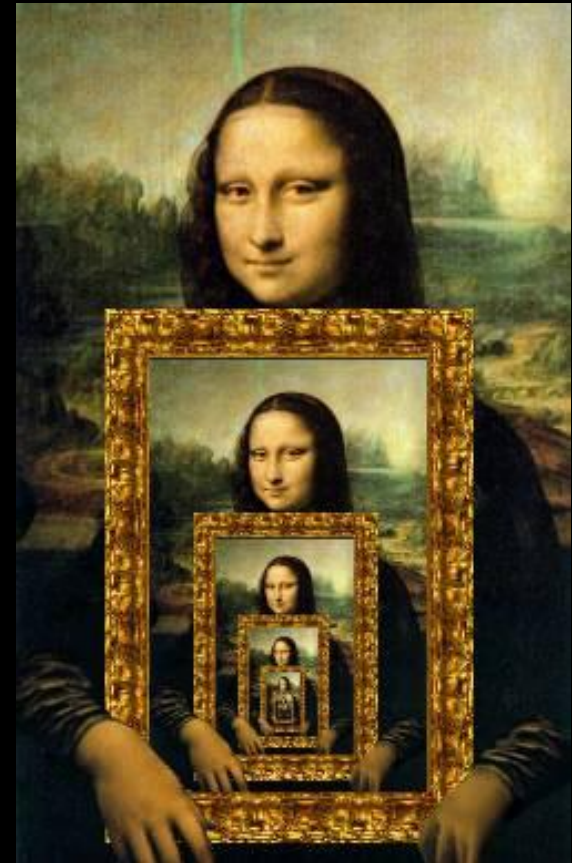


Walter Benjamin

The work of art in the age of mechanical reproduction (1935).

The ability to reproduce a work of art through technology destroys its 'originality' and its 'uniqueness.'

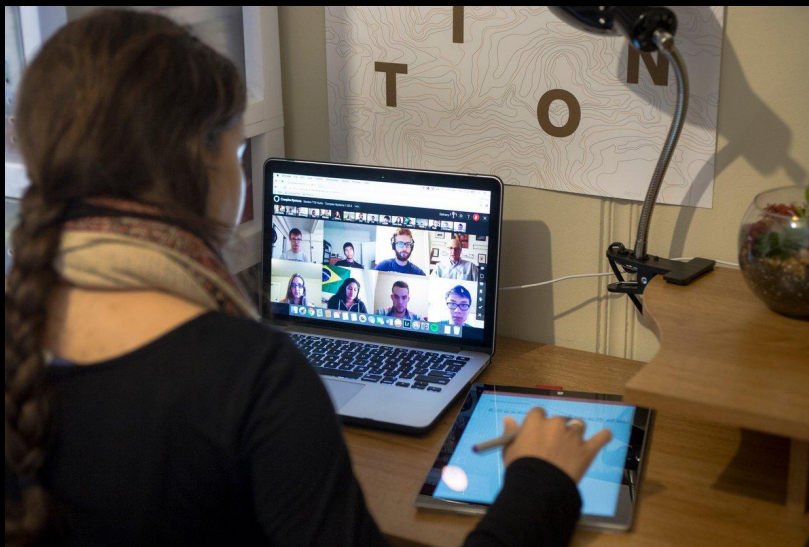
It loses its 'aura'.



Project-based learning course: “The University as a Design Problem”

(Bass, Giordano, Martin & Menafee)

In a pandemic year where we all shifted to remote learning, what was lost and gained?



What is the equivalent of ‘aura’ in learning?

What makes a learning experience feel ‘unique in time and space’?

And can you design for it?

My core point:

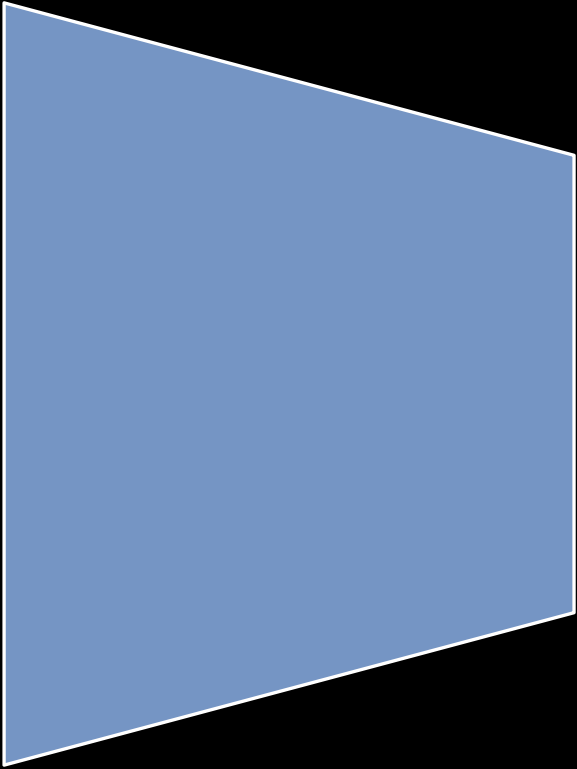
Learning takes work. Learning does work.

The *work* that **project-based learning** is doing is the heart of the work of higher education.

It is the work that education needs to do to ensure a human future.

CORE MESSAGE

The future of higher education, the very survival of your institutions, and potentially **the future of humanity**, largely pivots on what you will be doing during this institute.



LEARNING TAKES WORK

THE WORK OF LEARNING

An Ethos of Community
& Care



THE WORK OF LEARNING

Expanding
Learning Designs



THE WORK OF LEARNING

A Push for Equitable Assessment

COVID-19 and nationwide antiracism protests have intensified conversations about inequity in higher education. One research group hopes to use the moment to promote more inclusive ways to validate learning.

By [Madeline St. Amour](#) // June 25, 2020



**Alternative
Assignments & Exams**

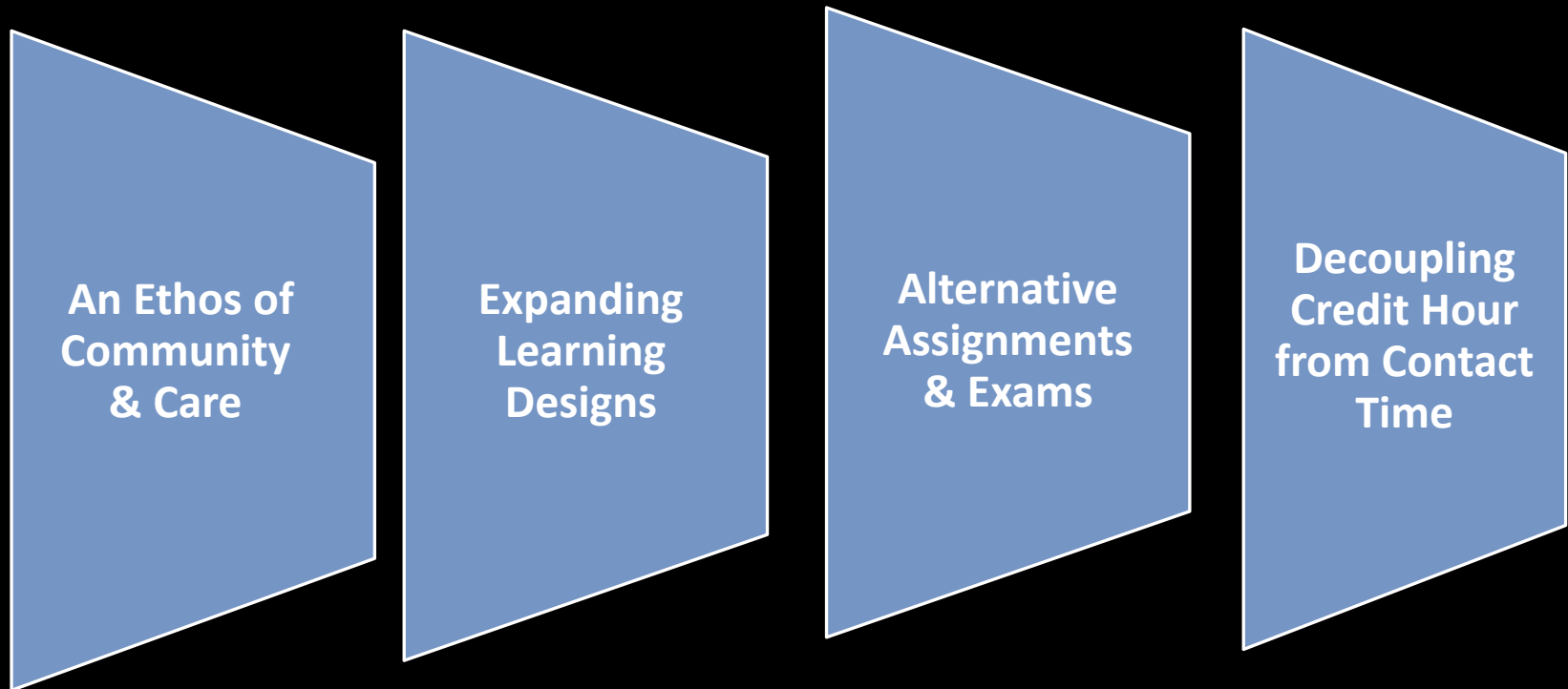
THE WORK OF LEARNING



Decoupling the Credit Hour
from Contact Time

THE WORK OF LEARNING

Evidence-based Pedagogies – Good Professional Practice



Raised the threshold for quality teaching
and learning.



**IN THIS CONTEXT, WHAT IS
THE WORK OF PROJECT-BASED
LEARNING?**

The pandemic came in the middle of a 20-30 year transition to a higher education centered around high-impact practices.

The Great Convergence



Global conditions demand that we focus on the role of education in cultivating those traits *that make us most human.*

“The University as a Design Problem” (Spring 2013)

Profs. Ann Pendleton Jullian and Randy Bass

2033: Designing for *context* not content

What will the conditions of knowledge, technology, learning and work be in 20 years?

What kind of graduate would we want to produce?

Existential Threats

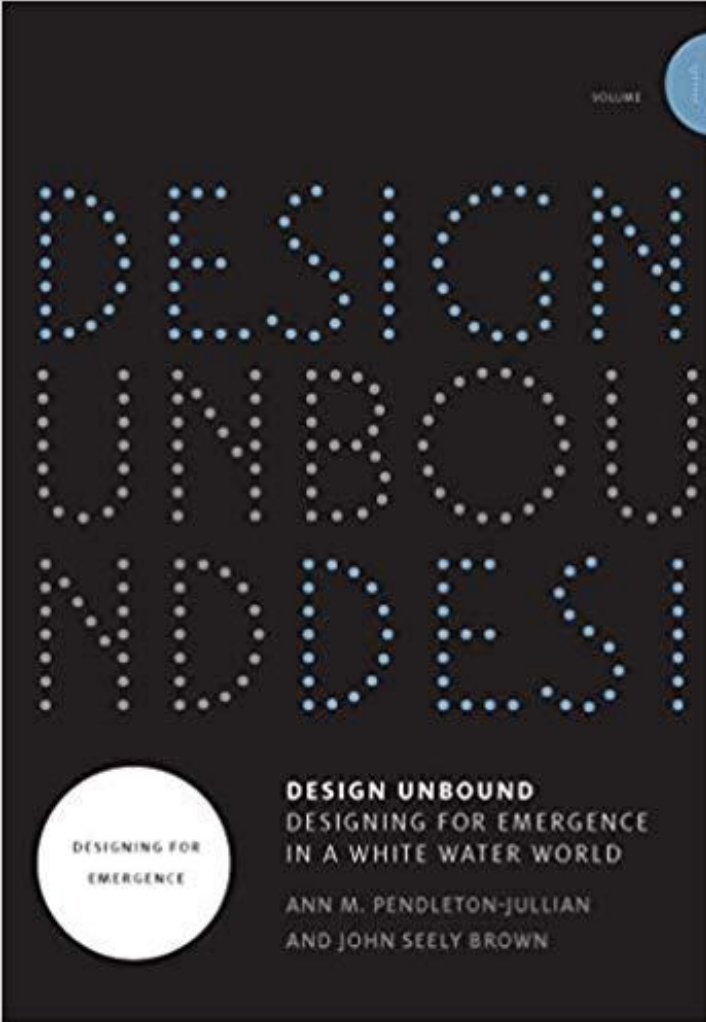
Artificial
Intelligence

Inequality

Global
Health

Misinformation
& Polarization

Environment



Design Unbound

Designing for Emergence in A Whitewater World



Ann Pendleton Jullian and John Seely Brown

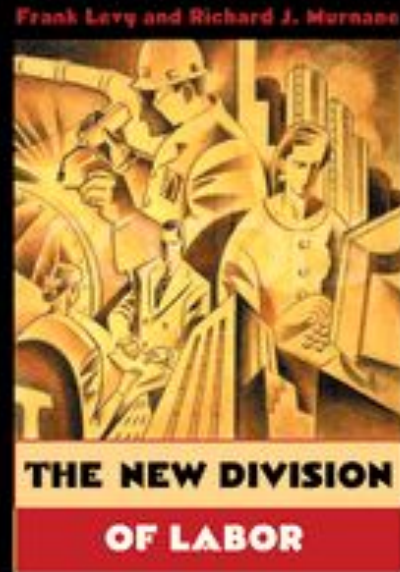
Humans in the age of artificial intelligence.

“The human labor market will center on three kinds of work:

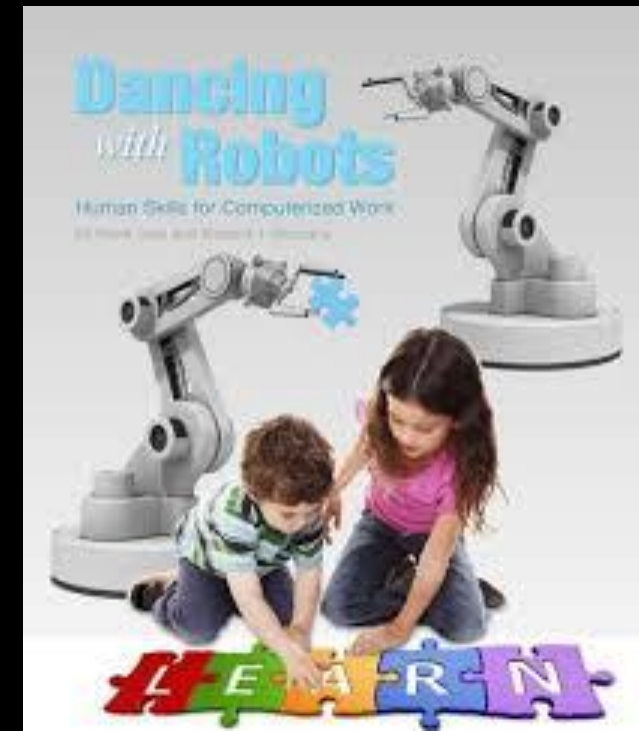
solving unstructured problems,

working with new information (including complex communication),

and carrying out non-routine manual tasks.”



How Computers are Creating the Next Job Market



Top 15 Skills for 2025

- Analytical thinking and innovation.
- Active learning and learning strategies.
- Complex problem-solving.
- Critical thinking and analysis.
- Reasoning, problem-solving and ideation.
- Systems analysis and evaluation.
- Technology use, monitoring and control.
- Technology design and programming.
- Leadership and social influence.
- Resilience, stress tolerance and flexibility.
- Emotional intelligence.
- Service orientation.
- Creativity, originality and initiative.
- Persuasion and negotiation.



The Great Convergence



The learning sciences have shown us that the **educational practices that have the “highest impact”** on learning are *those which develop the most human capacities.*

Purdue-Gallop Poll on Engaged Work and Flourishing



Life in College Matters for Life After College

New Gallup-Purdue study looks at links among college, work, and well-being

by Julie Ray and Stephanie Kafka



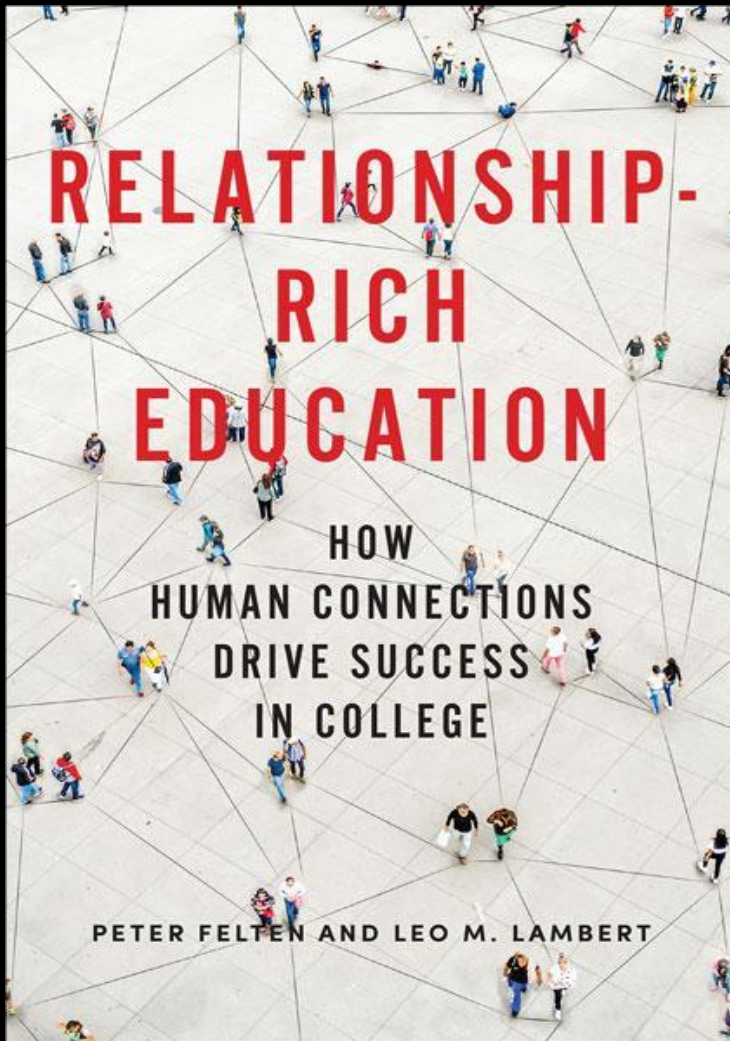
WASHINGTON, D.C. -- When it comes to being engaged at work and experiencing high well-being after graduation, a new Gallup-Purdue University study of college graduates shows that the type of institution they attended matters less than what they experienced there. Yet, just 3% of all the graduates studied had the types of experiences in college that Gallup finds strongly relate to great jobs and great lives afterward.

Two most important predictors of success:

- 1) **Adult mentor who cared about your hopes and dreams.**
- 2) **Sustained project of a semester or longer.**

13% had both.

Relationship-rich Education



Every student must experience genuine welcome and deep care.

Every student must be inspired to learn.

Every student must develop a web of significant relationships.

Every student must explore questions of meaning and purpose.

What does it take to educate a whole person?

Knowledge + Skills + Dispositions

Dispositions:

Learning to learn

Comfort with uncertainty

Creativity

Curiosity

Resilience

Empathy

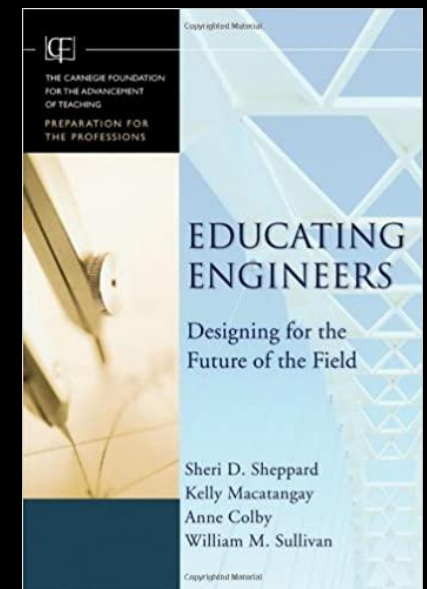
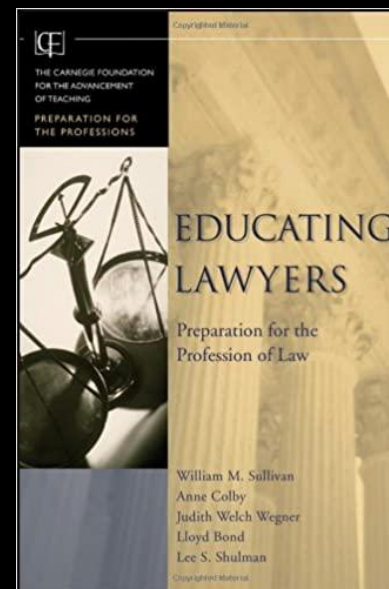
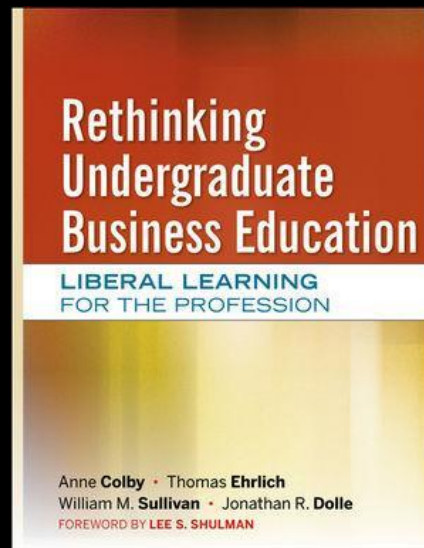
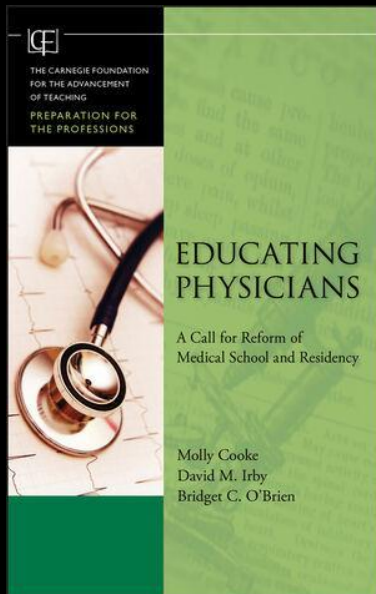
Humility

Ethical Judgment

- These cannot be taught through direct instruction.
- Design environments where they are more likely to be cultivated.
- Unscripted contexts, guided inquiry and experience.

Carnegie Foundation Studies of the Professions

“Judgment in Uncertainty”



ROBOT-PROOF



HIGHER EDUCATION
IN THE AGE OF
ARTIFICIAL INTELLIGENCE

JOSEPH E. AOUN

ROBOT PROOF

Humanics

The New Literacies

Technological Literacy
Data Literacy
Human Literacy

The Cognitive Capacities

Critical Thinking
Systems Thinking
Entrepreneurship
Cultural Agility

Joseph Aoun, Robot-Proof

We have seen that when learners put their knowledge into practice in real-life situations, they develop a better understanding of themselves, their strengths and weaknesses, and their drives and possibilities. They also sharpen their cognitive capacities, leading to the robot-proof qualities of creativity and mental flexibility—both aspects of far transfer.

Joseph Aoun, Robot-Proof

By contrast, no computer has yet displayed creativity, entrepreneurialism, or cultural agility. And although machines are continually improving in their ability to map knowledge onto recognizable problems—in other words, improving in their near transfer abilities—they cannot perform far transfer well, at least not in the infinite contexts of real life.

Aoun, Joseph E.. Robot-Proof: Higher Education in the Age of Artificial Intelligence (MIT Press)

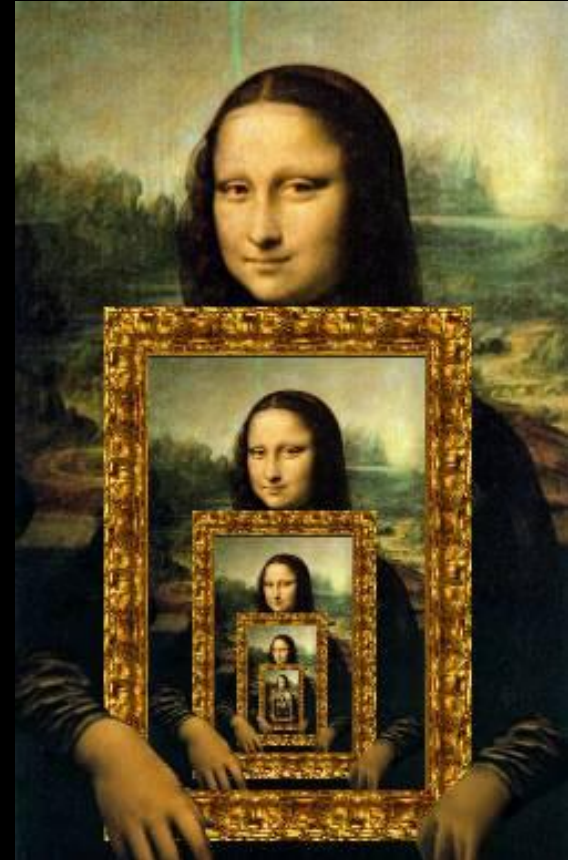
As machines get better
at being machines,
are humans getting better
at being human?

Project-based learning course: “The University as a Design Problem”

(Bass, Giordano, Martin & Menafee)



What is the equivalent of ‘aura’
in learning? What makes a
learning experience feel ‘unique
in time and space’?



And can you
design for it?

Knowledge of a domain

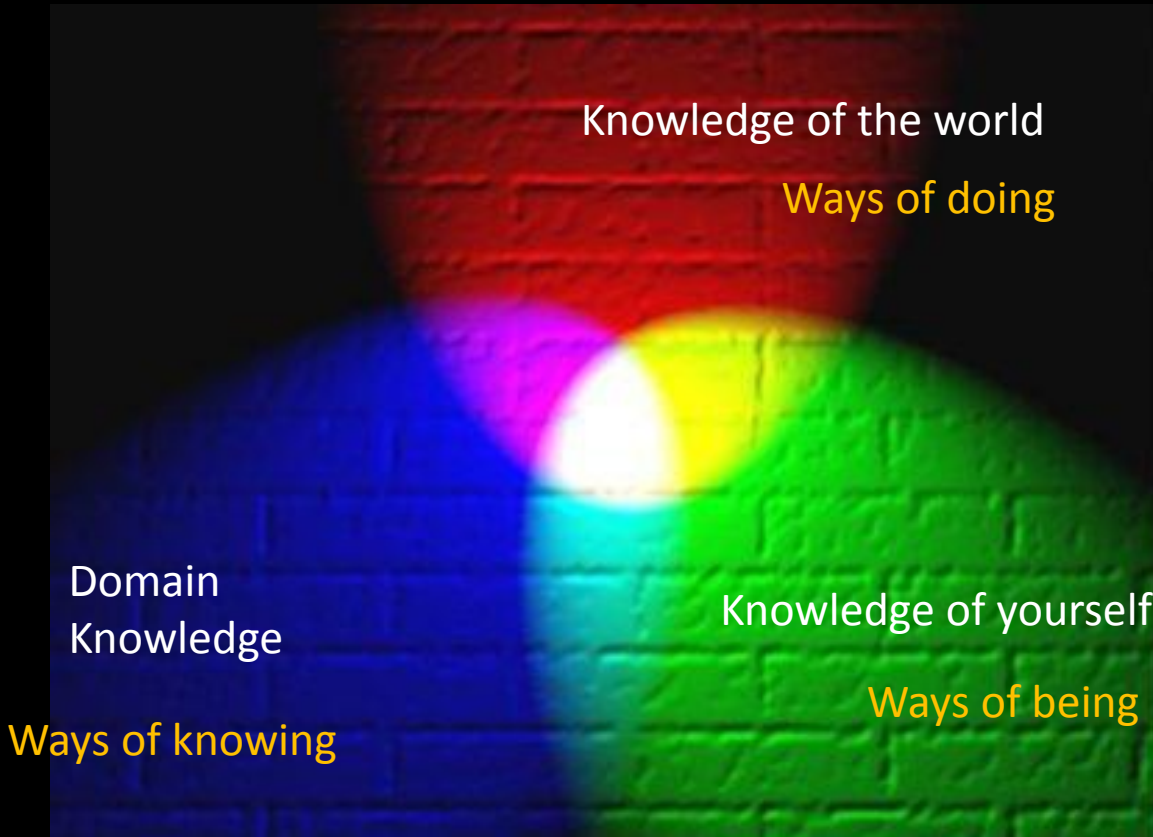
Knowledge of the world

Knowledge of yourself

Heidi Elmendorf, Ph.D.
Biology, Georgetown



Signature paradigm for the future of higher education?



The space of **significant learning**: formation, transformation and whole student development

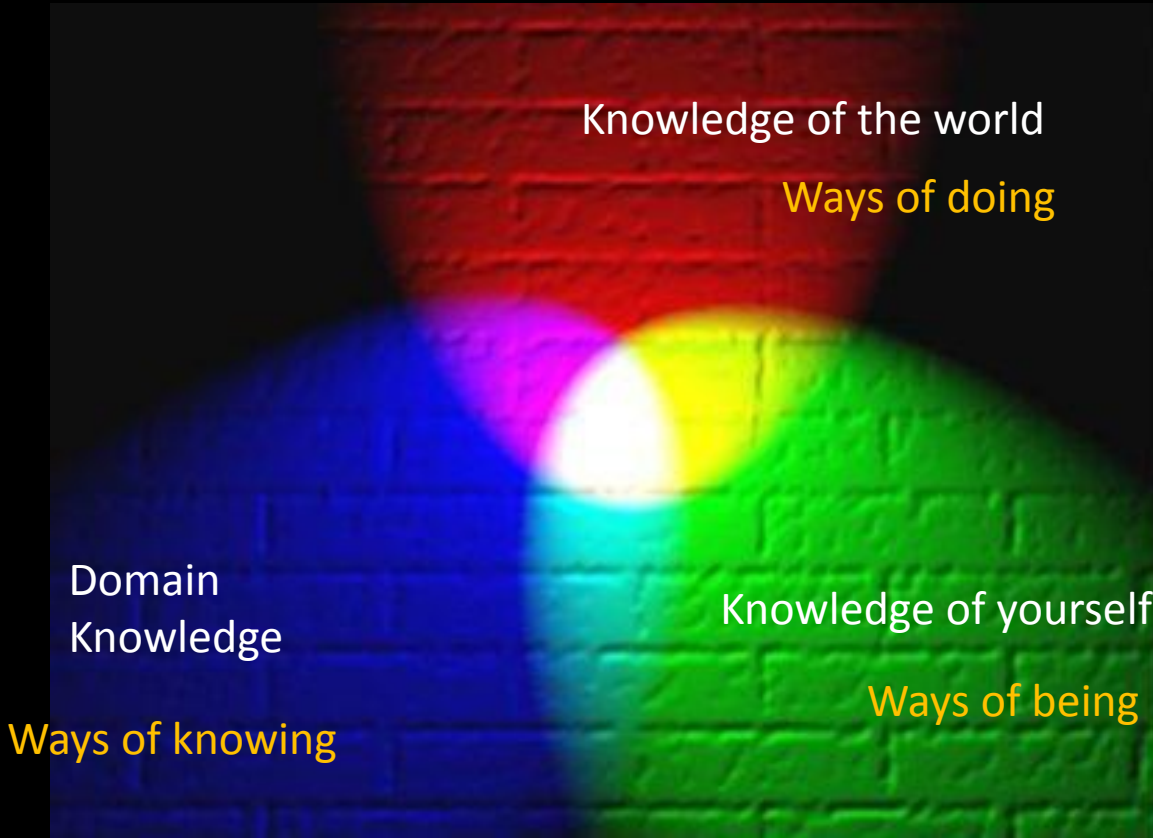
Reflective pause...

Think of something you did this year in your teaching that sits at the center of this schema.

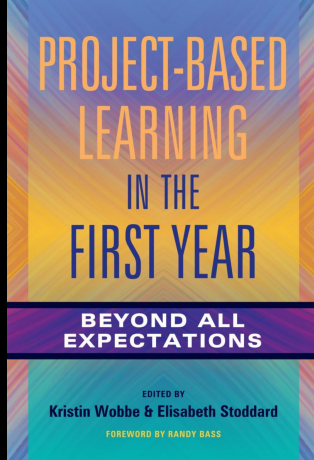
Take a couple of minutes to reflect and then type a sentence or so into the chat.



Signature paradigm for the future of higher education?



The space of **project-based learning**: formation, transformation and whole student development




Kristin K. Wobbe and Elizabeth A. Stoddard

MENU 



Worcester Polytechnic Institute

 SEARCH

 [HOME](#) > [ACADEMICS](#) > [UNDERGRADUATE STUDIES](#) > [GREAT PROBLEMS SEMINAR](#)

Great Problems Seminar

The Great Problems Seminar (GPS) is a two-term course that immerses first-year students into university-level research and introduces them to the project-based curriculum at WPI. The course gives students and faculty the opportunity to step outside their disciplines to solve problems focused on themes of global importance, culminating in annual Poster Presentation Days that celebrate students' innovative research on a wide range of solutions to some of the world's most critical challenges.

 [UNDERGRADUATE STUDIES](#)

[GREAT PROBLEMS SEMINAR](#)

TEN YEARS OF THE GREAT PROBLEMS SEMINAR

Teaching Students to Care

Finding Humanitarian Solutions to Real-World Problems

Great Problems Seminar

The Great Problems Seminar (GPS) is a two-term course that immerses first-year students into university-level research and introduces them to the project-based curriculum at WPI. The course gives students and faculty the opportunity to step outside their disciplines to solve problems focused on themes of global importance, culminating in annual Poster Presentation Days that celebrate students' innovative research on a wide range of solutions to some of the world's most critical challenges.

← UNDERGRADUATE STUDIES

GREAT PROBLEMS SEMINAR

TEN YEARS OF THE GREAT PROBLEMS SEMINAR



Extinction: Who Will Survive?

Heal the World

Humanitarian Engineering: Past & Present

Designing Progress: Living on the Edge

Food Sustainability

Ignorance is Not Bliss: Can Schools and Technology Help?



Great Problems Seminar

The Great Problems Seminar (GPS) is a two-term course that immerses first-year students into university-level research and introduces them to the project-based curriculum at WPI. The course gives students and faculty the opportunity to step outside their disciplines to solve problems focused on themes of global importance, culminating in annual Poster Presentation Days that celebrate students' innovative research on a wide range of solutions to some of the world's most critical challenges.

TEN YEARS OF THE GREAT PROBLEMS SEMINAR

Teaching Students to Care

Finding Humanitarian Solutions
World Problems

← UNDERGRADUATE STUDIES

GREAT PROBLEMS SEMINAR

WPI Great Problem Seminars



Goals:

- Engage first-year students with current events, societal problems, and human needs;
- Require first year students to perform/produce critical thinking, information literacy, and evidence-based writing;
- Devote time and attention to nurture the development of professional skills including effective teamwork, time management, organization, and personal responsibility.

Ethnic Food Market Assignment

The screenshot shows the website for the Great Problems Seminar at Worcester Polytechnic Institute. The header includes the WPI logo and name, a search bar, and a navigation menu with links to HOME, ACADEMICS, UNDERGRADUATE STUDIES, and GREAT PROBLEMS SEMINAR. The main heading is "Great Problems Seminar". Below it, a paragraph describes the seminar as a two-term course for first-year students. To the right, there are two buttons: "← UNDERGRADUATE STUDIES" and "GREAT PROBLEMS SEMINAR". A central button reads "TEN YEARS OF THE GREAT PROBLEMS SEMINAR". At the bottom, two dark blue boxes contain the text "Teaching Students to Care" and "Finding Humanitarian Solutions to Real-World Problems".

Ethnic Markets/Food Costs

You have been divided into groups and assigned 2 amounts of money, either \$90 and \$120 or \$90 and \$150. Each group has also been assigned a local market. Go to your assigned market and determine what you would buy to feed a family of 4 for a week if you had only \$90. Then decide what you would do differently if you could spend the larger amount of money (either \$120 or \$150). . . . *Your primary consideration* is to keep your family from being hungry; this means meeting the caloric needs of the family for the week.



MEKONG MARKET PROJECT

Our Store



For our project, our group took an Uber to Mekong Market. This store is known for selling international foods primarily from Asia while also selling the typical vegetables, fruits, meats, and other common items found in all grocery stores. The store is small, has a small parking lot, and seems to be in a low-income neighborhood. The median income in the neighborhood around the market is \$31,500. The ethnicity of the residents in the area are 38.9% Hispanic, 40.8% White, 16.6% Asian, 3.1% Black, and 0.7% Multi-race. The median resident age is 25, almost 40% of the residents are in poverty, and about 20% are unemployed.

Our Trip

Our trip took place on Friday the 8th, and we got there in an Uber which we all split the costs for. We drove for about 10 minutes through the neighborhood around the Mekong Market and then we got dropped off in front of the store. Getting there

\$80 Budget				
Cal/person				
M	F	C (8)	C (6)	
550	412	321	275	
1398	1049	816	699	
472	354	276	236	
2421	1816	1412	1211	

\$150 Budget				
Cal/person				%
M	F	C (8)	C (6)	All
539	404	314	269	
1407	1055	821	704	
481	361	281	241	
2427	1820	1416	1214	

Male	Female	Child 8y/o	Child 7y
2400	1800	1400	1200
0.3529	0.2647	0.2059	0.1765
480	360	280	240
1440	1080	840	720
480	360	280	240

PROJECT-BASED LEARNING FOR FIRST-YEAR STUDENTS



[Home](#) [Making the Case](#) [Preparation](#) [Application in the Classroom](#) [About the Editors](#) [Contact](#)

MEKONG MARKET PROJECT

Ethnic Food Market Assignment

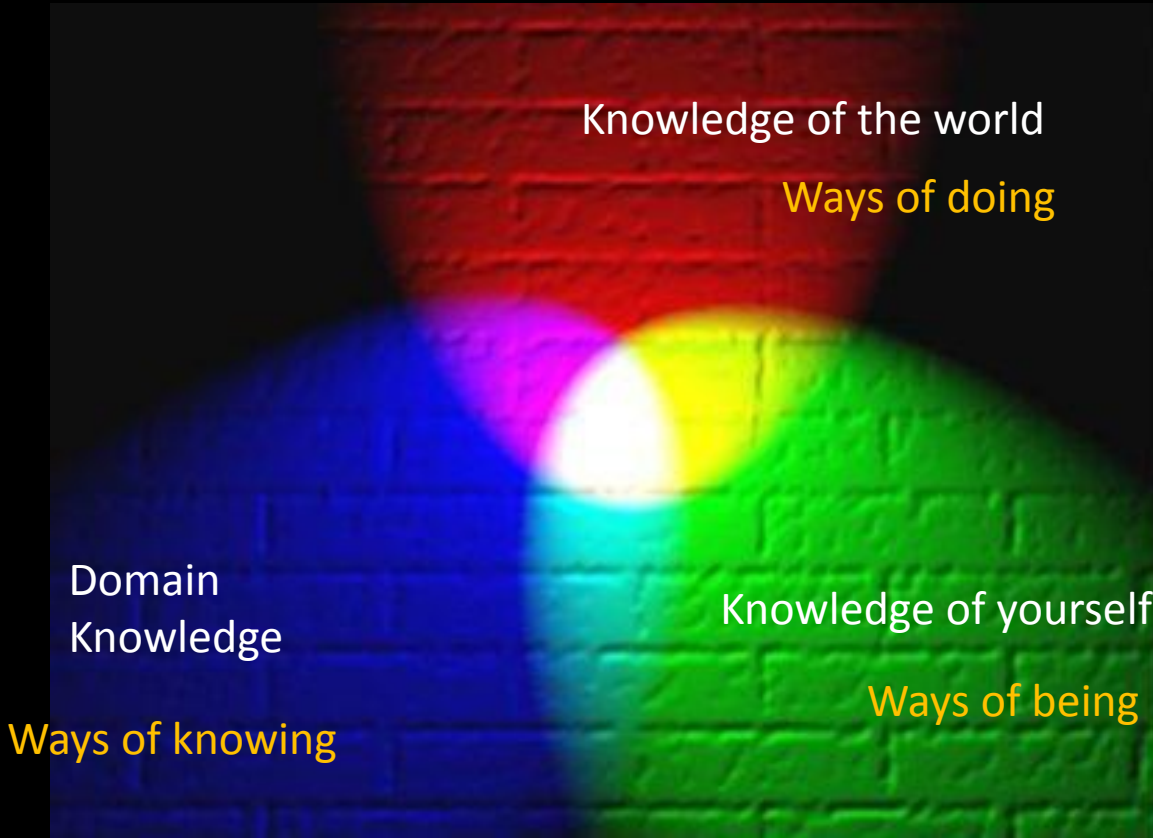


The screenshot shows the website for the Great Problems Seminar at Worcester Polytechnic Institute. The header includes the WPI logo and name, a search bar, and a navigation menu with links to Home, Academics, Undergraduate Studies, and Great Problems Seminar. The main content area features the title "Great Problems Seminar" and a paragraph describing the course as a two-term project-based research experience for first-year students. A button labeled "TEN YEARS OF THE GREAT PROBLEMS SEMINAR" is positioned below the text. On the right side, there are two navigation buttons: "← UNDERGRADUATE STUDIES" and "GREAT PROBLEMS SEMINAR". The footer contains two columns of text: "Teaching Students to Care" and "Finding Humanitarian Solutions to Real-World Problems".

Ethnic Markets/Food Costs

Goals of this assignment: By the end of this assignment you will know a bit more about Worcester, and you will have a broader awareness of the constraints on food choices imposed by income, geographic location, and cultural preferences as well as the impact on nutrition. (Plus you might have a greater appreciation for whomever it was in your family who did the shopping and meal prep in your household.)

Signature paradigm for the future of higher education?



The space of **project-based learning**: formation, transformation and whole student development

THE GREAT CONVERGENCE



Global conditions demand that we focus on the role of education in cultivating those traits *that make us most human.*

The learning sciences have shown us that the **educational practices that have the “highest impact”** on learning are those which develop the most human capacities.

Inclusive and intentional high-impact practices have significant impact on **addressing systemic inequity.**



Regents Science Scholars

Launched in 2016, the Regents Science Scholars Program provides support for first-generation college students majoring in biomedical fields.





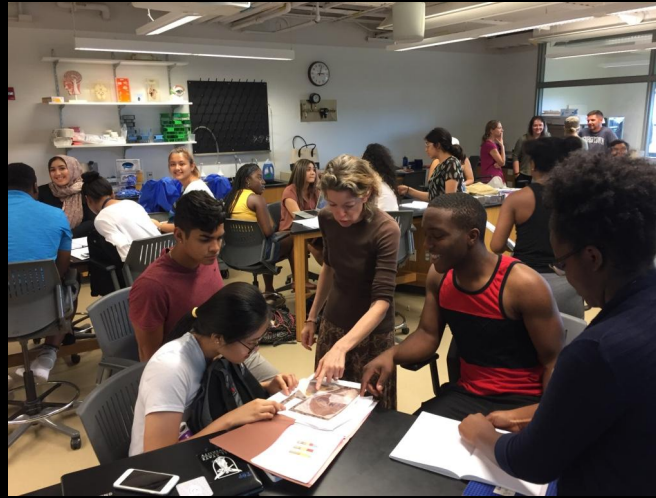
Summer before the first year:

Students enroll in a residential summer bridge program

Every subsequent summer:

Students take specially designed online modules to focus learning, while allowing students to work and be home with their families.

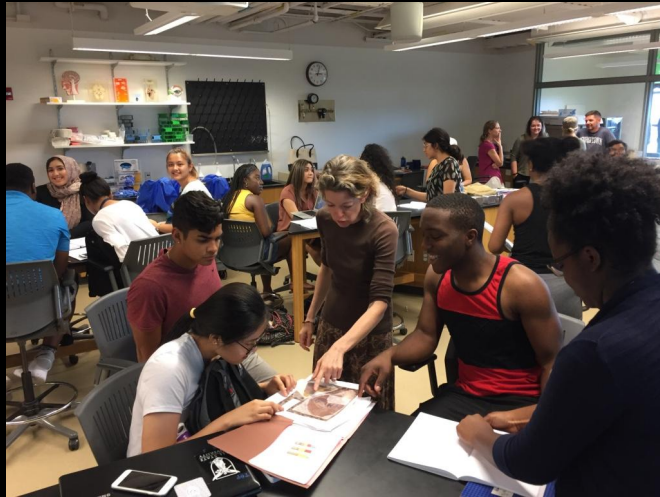
From Active to Project-Based



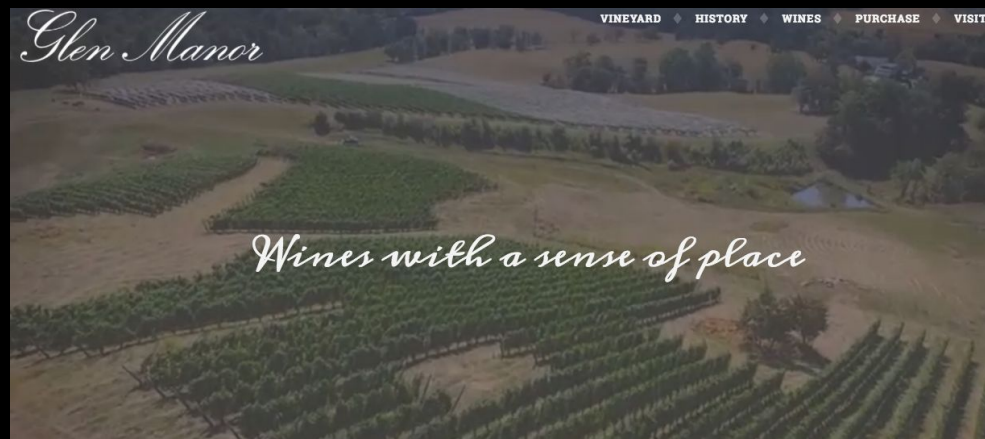
Focus on:

- Professional identity
- Impact
- Agency
- Community

“We had been focused on fixing deficits, not building strengths.”



Glen Manor Feral Wine Project



Glen Manor Vineyards Case Club Event Announcement

For a few years I have wanted to try un-inoculated fermentations. Called Feral fermentations because yeast come from a multitude of sources, the vineyard, the cellar, in the air and different yeast strains get together to create new yeast strains, all of which can impact a wine in very complex and interesting ways. After a few years of small and successful trials, in 2016 I finally had the right conditions and enough nerve to explore this on a much larger scale in our red wine program. To better learn, we also performed our normal commercial yeast fermentations and now have wines of the same grape variety and planting fermented using both methods.

I would like you to taste these wines.

You are cordially invited into our cellar for our Spring Barrel Tasting, to taste and learn about these yeast trials that we conducted with our 2016 red wines. We will lead you through stations where at each stop you will taste and compare two wines exhibiting how yeast can affect a wines aroma, flavor, structure and style.



Professor Heidi Elmendorf, Biology
Director, Regents Science Scholars Program

“We covered everything we would have covered just in the context of this project.”

“They were surprised and daunted that they were the research team. But within one day the most common phrase was, “**what would help Jeff?**”

Good Morning,

I have been thinking about the design of the lab all night. And I think I have an understanding now after reading the material all over again.

My suggestion is to create an experiment with like 20 control groups and tests. I would number the different locations that the microbes are found (on grape, leaf, soil, etc.) then organize them into hypothetical dishes. This way hypothetically speaking I will create multiple juices using different combinations of the microbes... This would help me keep track of them, and allow me to distinguish one group from another.

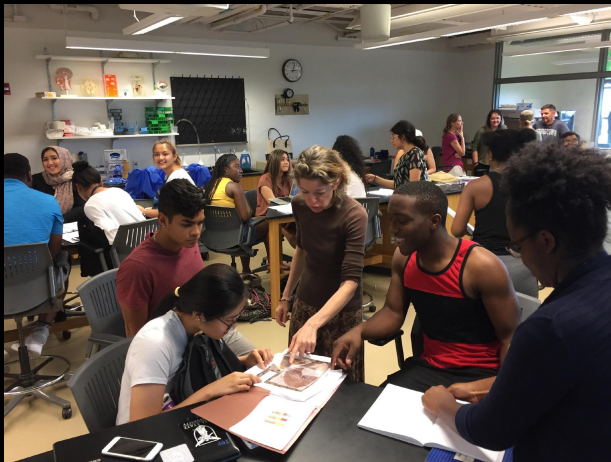
Does this seem possible?

Can this lead me to understanding its flavor profile, giving Jeff the best possible taste?

All the best,
Nohad W



- 1-4: Purcellville-Tankerville Complex, 15-25% slope
- 5-8: Tankerville-Purcellville Complex, 15-25% slope
- 9-10: Myersville Silt Loam, 2-7% slope
- 11-12: Philomont-Tankerville Complex, 7-15% slope
- 13-14: Purcellville-Tankerville Complex, 15-25% slope
- 15-16: Purcellville Loam, 15-25% slope







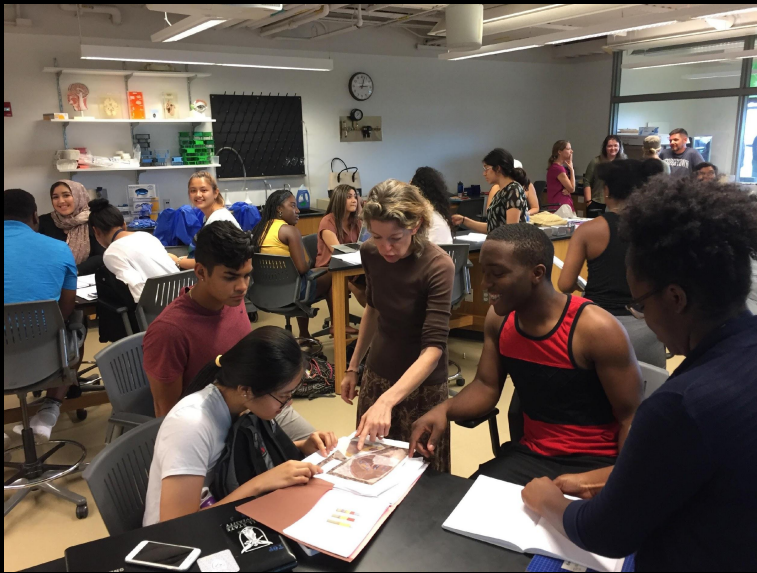




Regents Science Scholars

In five years, the number of first gen/low income students in biomedical majors has increased 5x.

>20% of the matriculating class of Biology majors are first-gen, low-income students





“you’ve got the
sequence all
wrong”



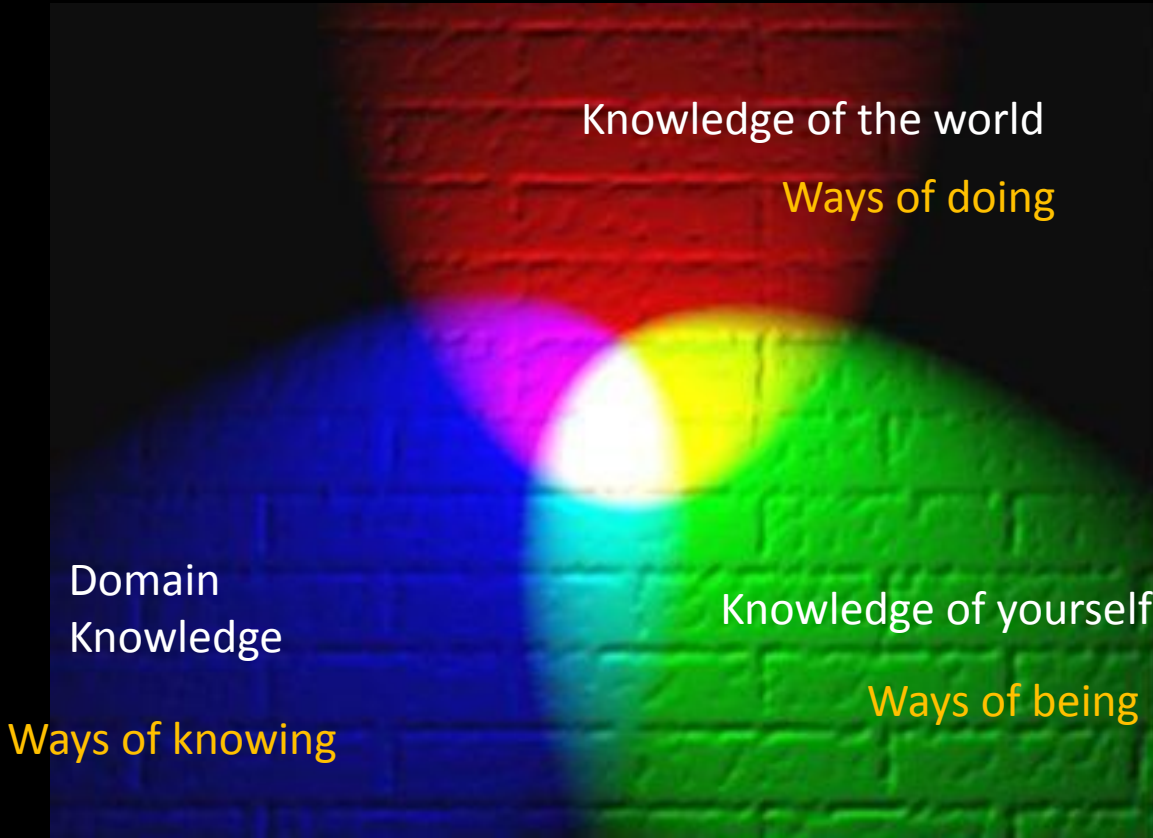
2019: Public Presentations to staff, faculty and Jeff!



“you’ve got the
sequence all
wrong”



Signature paradigm for the future of higher education?



The space of **project-based learning**: formation, transformation and whole student development

THE GREAT CONVERGENCE



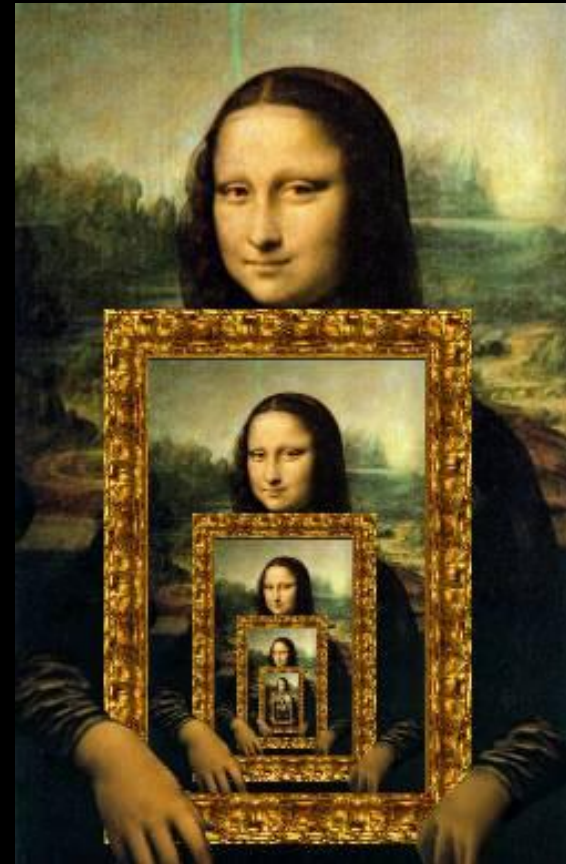
Global conditions demand that we focus on the role of education in cultivating those traits *that make us most human.*

The learning sciences have shown us that the **educational practices that have the “highest impact”** on learning are those which develop the most human capacities.

Inclusive and intentional high-impact practices have significant impact on **addressing systemic inequity.**

Project-based learning course: “The University as a Design Problem”

(Bass, Giordano, Martin & Menafee)



What is the equivalent of ‘aura’
in learning? What makes a
learning experience feel ‘unique
in time and space’?

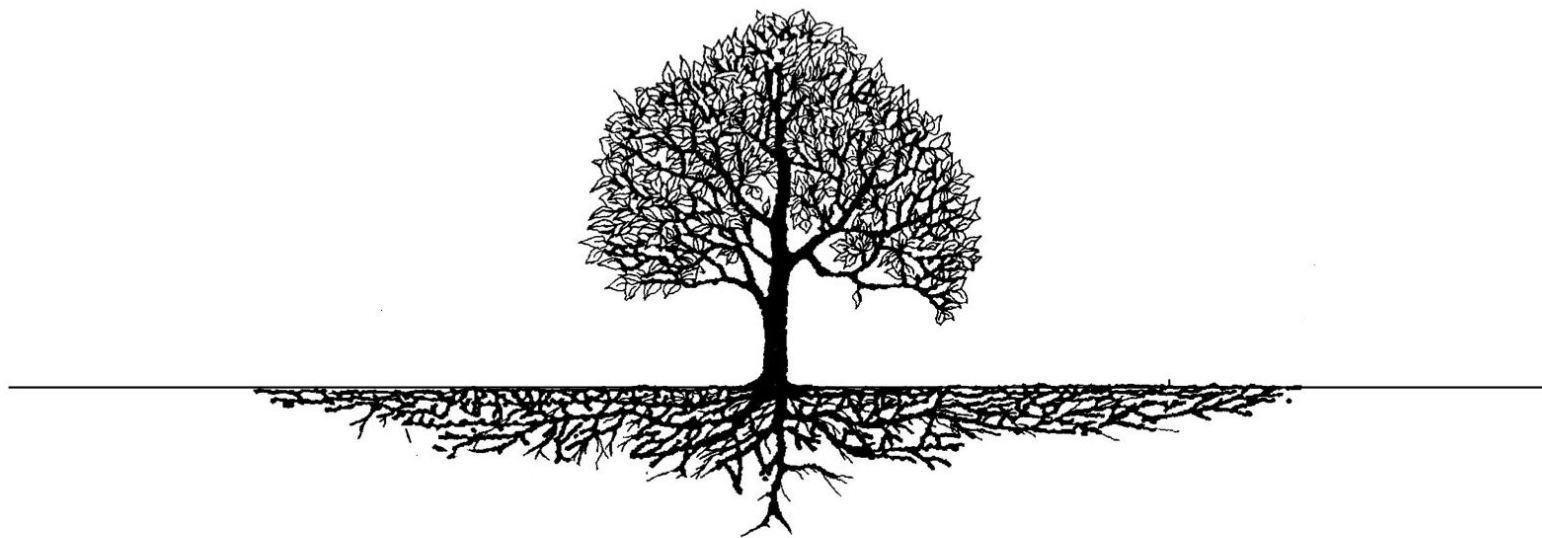
And can you
design for it?

“The University as a Design Problem”

AY 20-21 Edition

Focus: Design a course that would help students truly understand the complexity of knowledge and different perspectives needed to take on the world’s most wicked problems.

Developed a framework for a signature course for the School of Foreign Service, called “**The Problem of Globe.**”



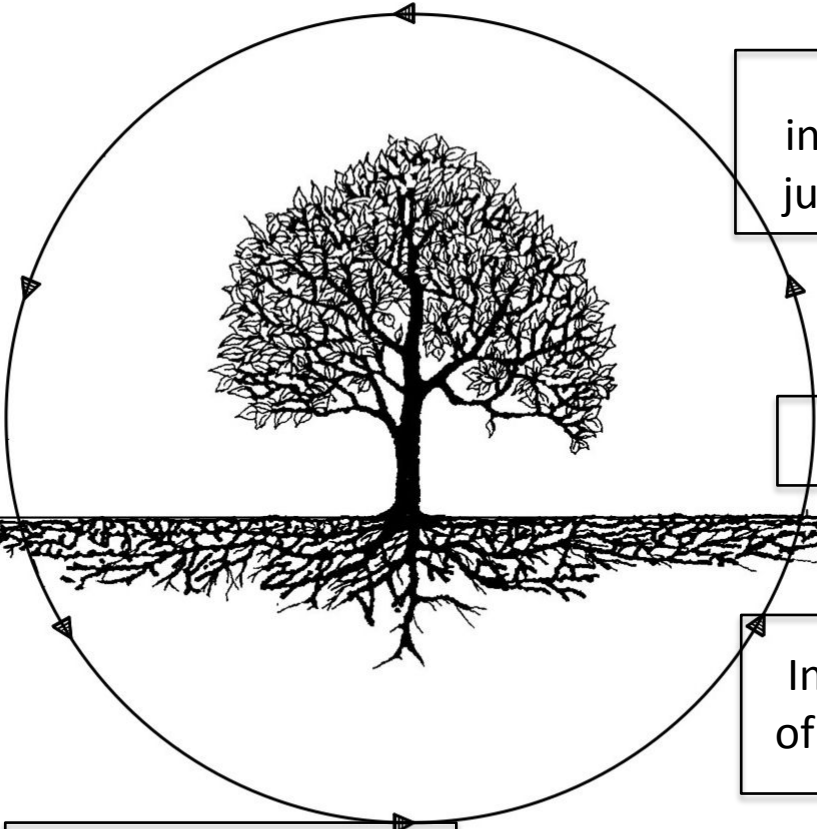
Peris Lopez, Sophomore, Georgetown

The quality of learning that you get.

'COEVOLUTION'



The kind of learning space you create.



Graduates who are independent, exercising judgment in uncertainty

Deep Learning.

Inclusive community of learners and doers.

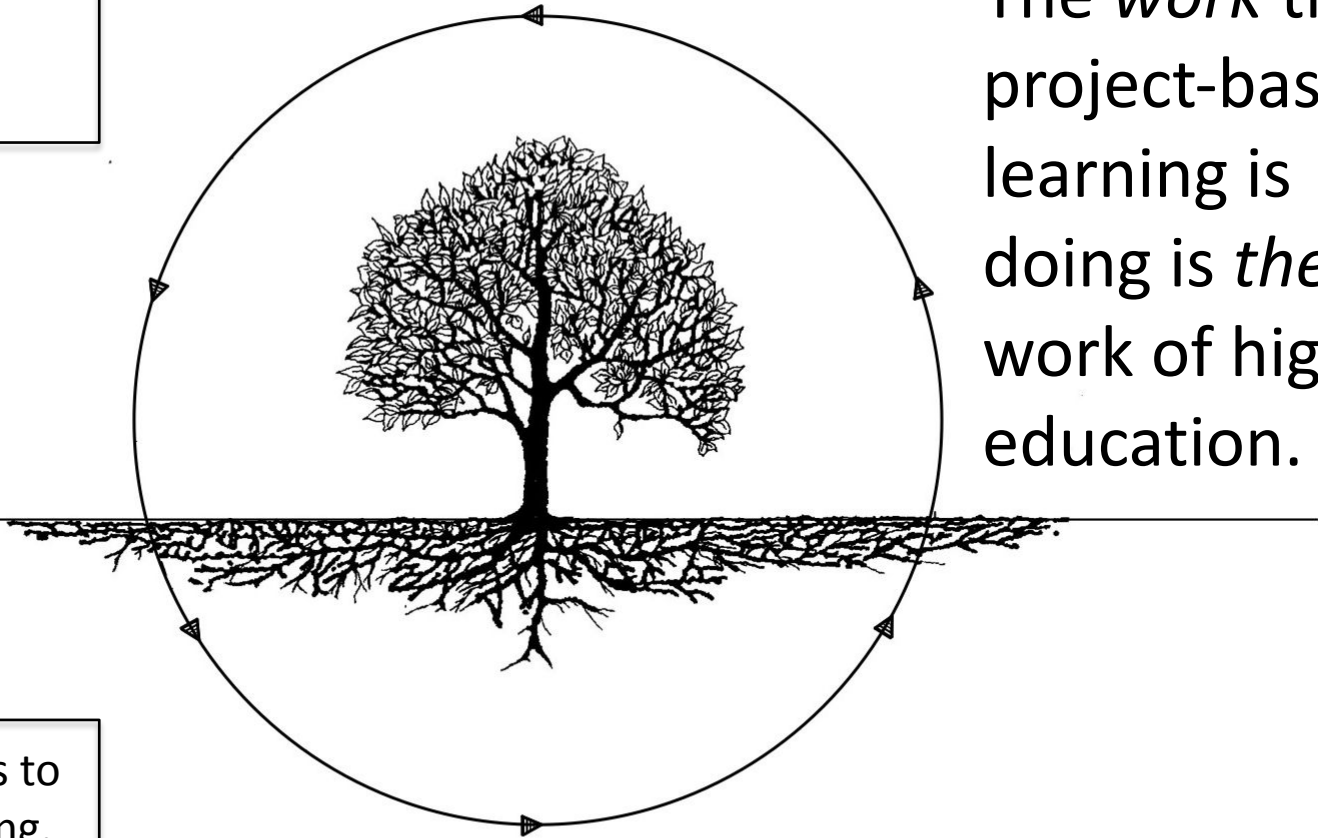
Complex unstructured problems.

Giving students responsibility

The work that that learning does in the world.

'COEVOLUTION'

The work it takes to design for learning.



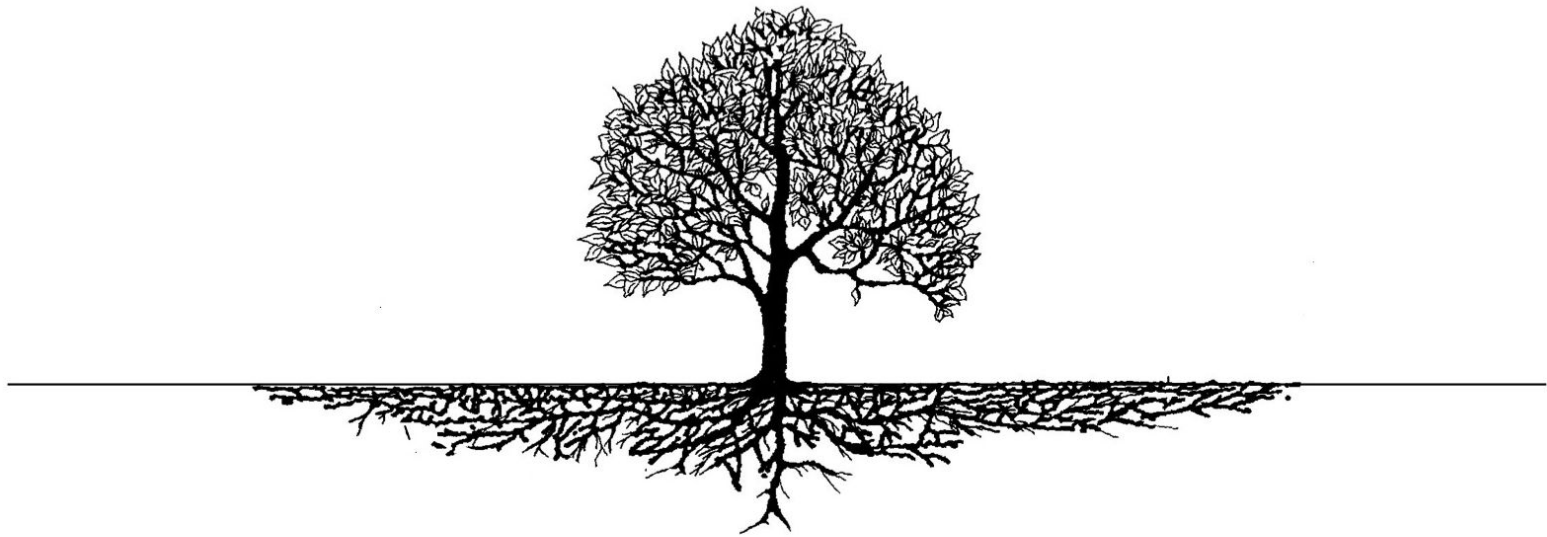
The *work* that project-based learning is doing is *the* work of higher education.

It is the work that education needs to do in order to ensure a human future.

CORE MESSAGE

The future of higher education, the very survival of your institutions, and potentially **the future of humanity**, largely pivots on what you will be doing during this institute.

Thank You and Good Luck!



bassr@georgetown.edu