ASEE WEBINAR

Learning in the Time of Coronavirus

March 30, 2021

1:00 – 2:00 PM, ET

Upcoming Webinars

Writing Effective COVID Impact Statements: Emerging Insights And Best Practices

April 26, 2021

2:00 – 3:00 PM, ET

Safe Zone Ally Training: Level 1

May 4, 2021

2:00 – 3:30 PM, ET

Safe Zone Ally Training: Level 2

May 11, 2021

2:00 – 3:00 PM, ET

resources.asee.org/course-catalog

Today's Facilitators

Karl A. Smith

PURDUE UNIVERSITY

UNIVERSITY OF MINNESOTA

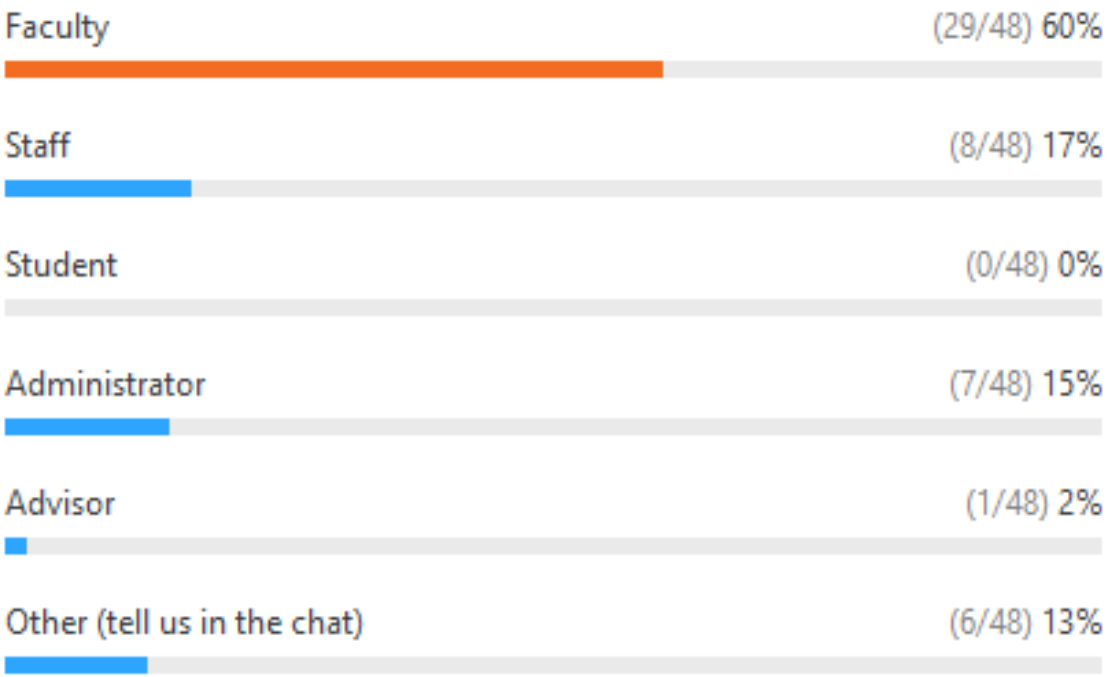
He pronouns

Rocío Chavela Guerra

ASEE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

She pronouns

Poll: Please select your current role.



The Time of Coronavirus

Shifts in Engineering Education

- What were/are they?
- What did we learn/are learning about advancing engineering education?
- What are the implications for learning in the time of coronavirus?

Prior Shifts

Engineering science

Outcomes and accreditation

Engineering design

Social-behavioral sciences

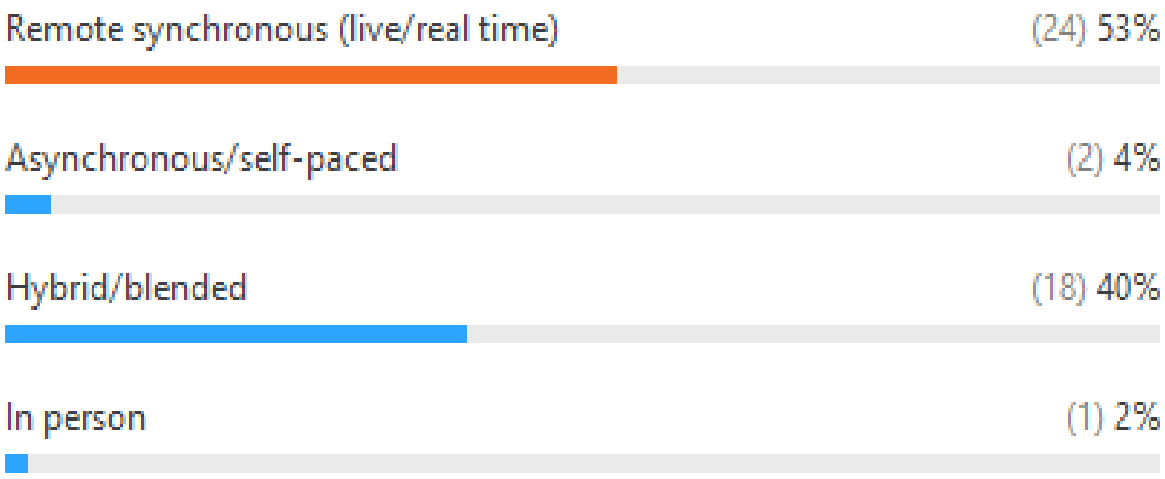
Information, communication, & computational technologies

Emerging Shifts

Ubiquitous remote T&L

Justice, equity, diversity, and inclusion (JEDI)

Poll: What is your approach to teaching and learning during the pandemic?



Prior Shifts

Engineering science

Outcomes and accreditation

Engineering design

Social-behavioral sciences

ICC technologies

Five Major Shifts in 100 Years of Engineering Education

By Jeffrey E. Froyd, *Fellow IEEE*, Phillip C. Wankat, and Karl A. Smith

http://ieeexplore.ieee.org/xpl/articleDetails.jsp?reload=true&tp=&arnumber=6185632

Engineering Science and Analytical Emphasis

Theory
(Study grounded in theory/conceptual framework)

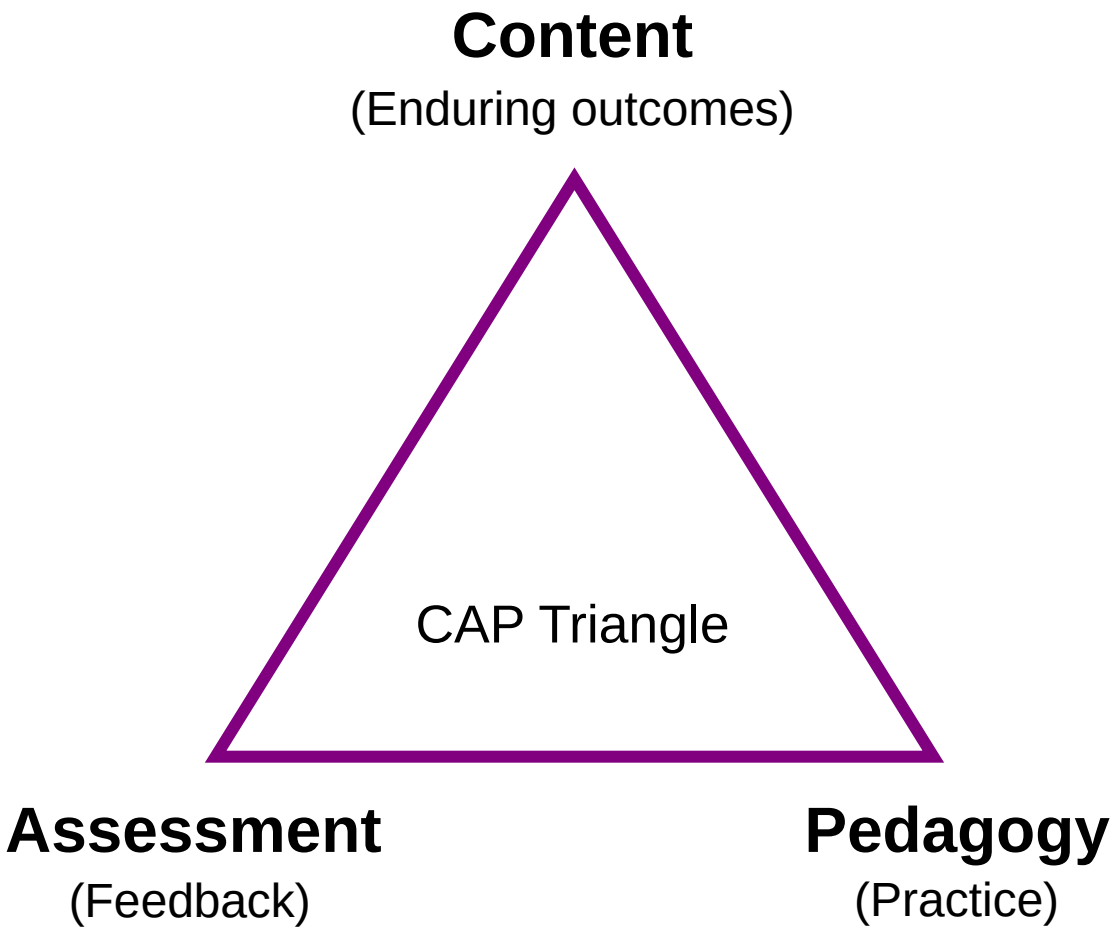
Research
(Appropriate design and methodology)

Practice
(Implications for teaching)

IMPLICATION:

Theory and research matter.

Outcomes-based Education and Accreditation

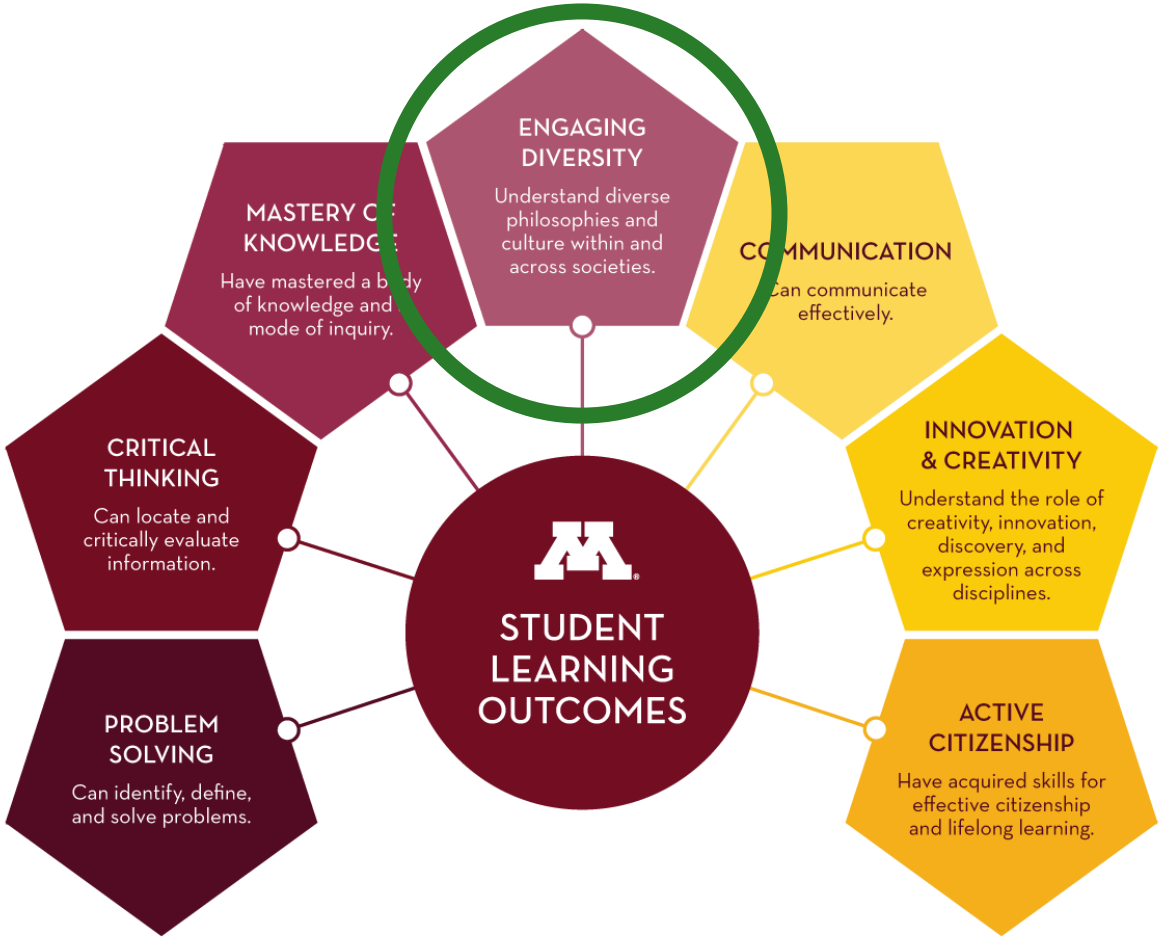


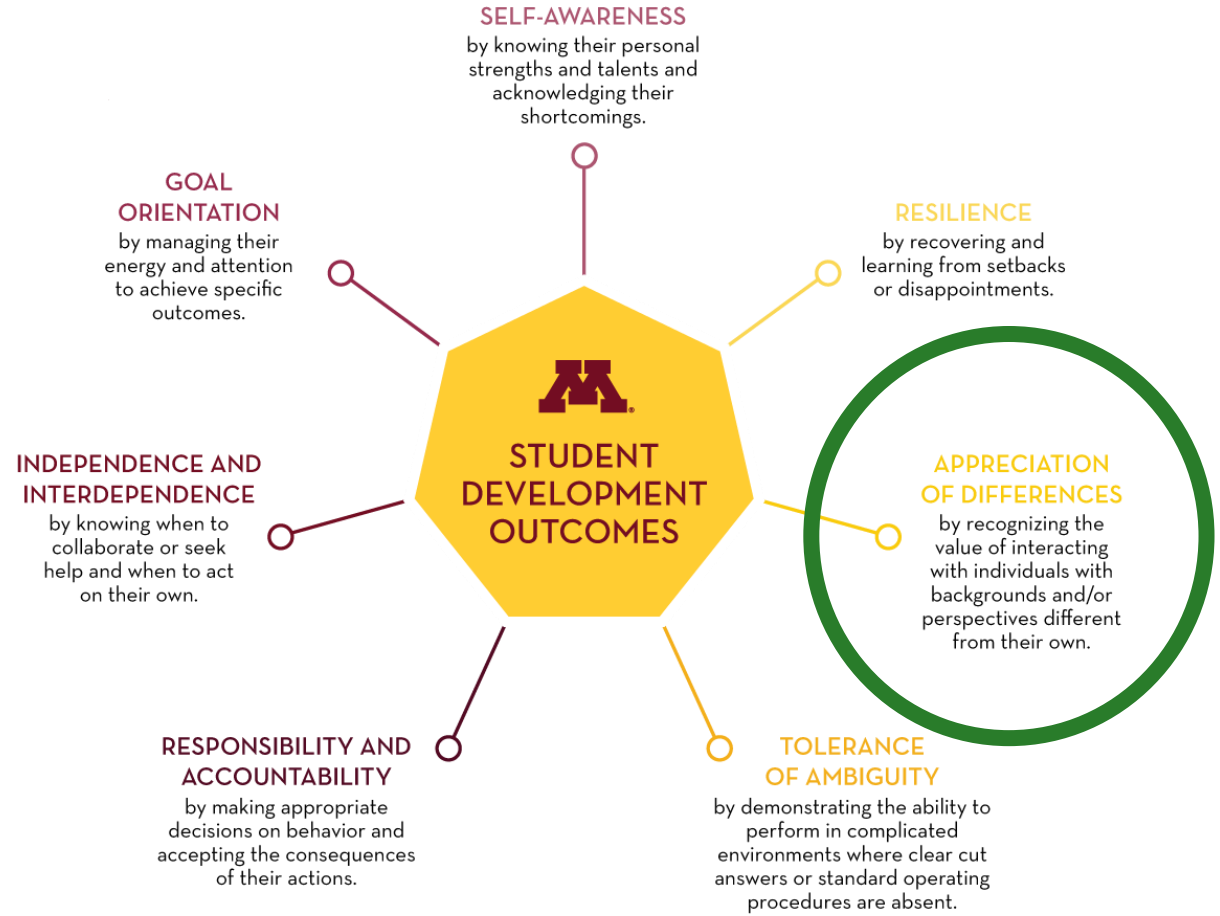
IMPLICATION:

Identifying and articulating enduring outcomes is a critical part of effective course design.

See: Streveler & Smith (2020)

Learning and Development Outcomes UMN



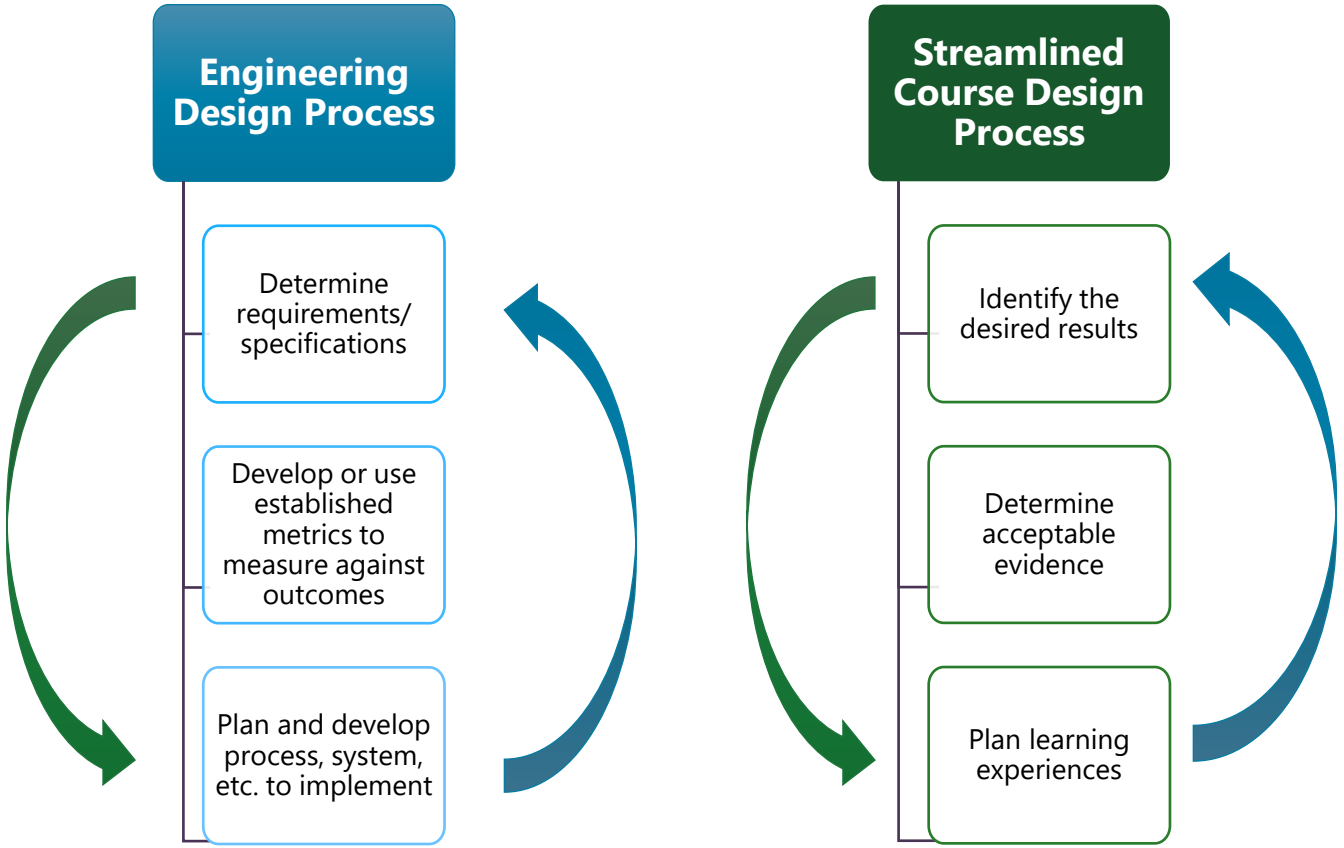


Activity: What have you done to embrace diversity and make learning environments more welcoming and inclusive?

Reflect

Share in the Chat (optional)

Emphasis on Engineering Design



IMPLICATION:

Embracing the engineering design process for course design makes sense.

https://advances.asee.org/opinion-course-design-in-the-time-of-coronavirus-put-on-your-designers-cap/

James Duderstadt

Nuclear Engineering Professor
Former Dean, Provost and President
University of Michigan

“ It could well be that faculty members of the twenty-first century college or university will find it necessary to set aside their roles as teachers and instead become **designers of learning experiences, processes, and environments.”**

Education, Learning and Social-Behavioral Sciences

- How People Learn
- Interactive Learning
- Personal and Academic Support
- Psychological Safety

IMPLICATIONS:

Applying what we know about learning is essential:

Cognitive Domain

Affective Domain

Education, Learning and Social-Behavioral Sciences

How People Learn

Interactive Learning

IMPLICATIONS:

Applying what we know about learning is essential:

Cognitive Domain

Learning Requires…

Deliberate

- Cognitive load (bandwidth)
- Reflection

Distributed

- Repetition over time
- Multiple input modes

Practice

- Attentive
- Constructive
- Interactive

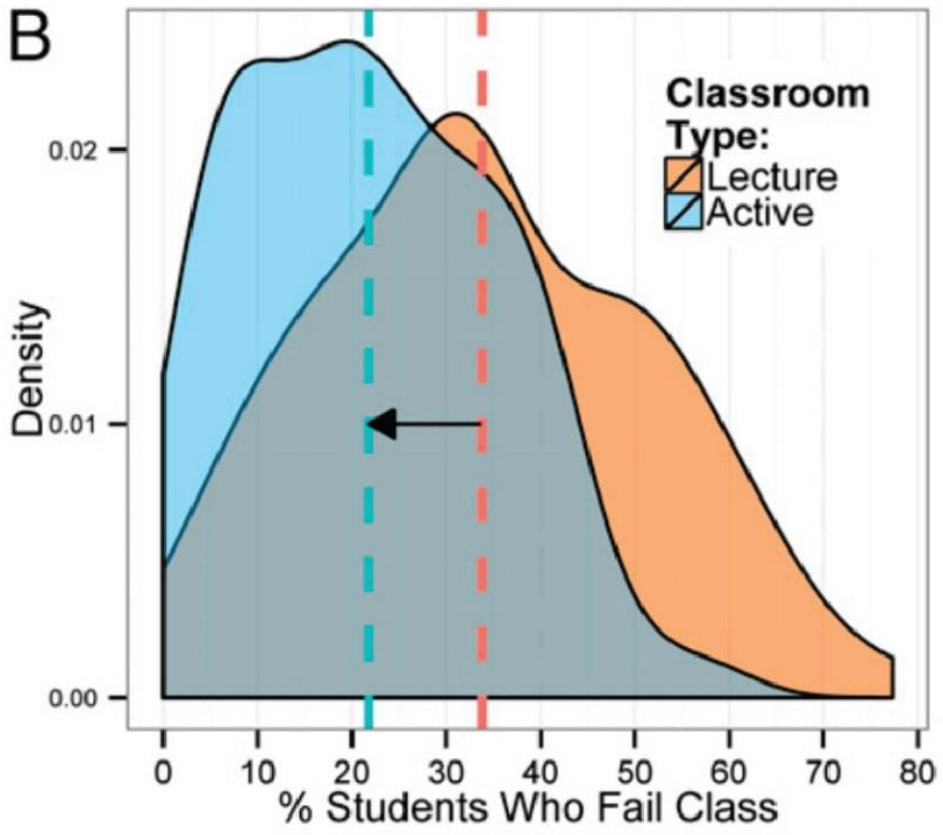
I-C-A-P Framework

Interactive	> Constructive	> Attentive ~~(Active)~~	> Passive
Substantive dialogue on the same topic, not ignoring a partner's contribution	Producing outcomes that go beyond presented information	Doing something physically Paying attention	
Guided-construction	Self-construction	Engaging activities	
Joint creation processes	Creation processes	Attending processes	

See: Chi (2009)

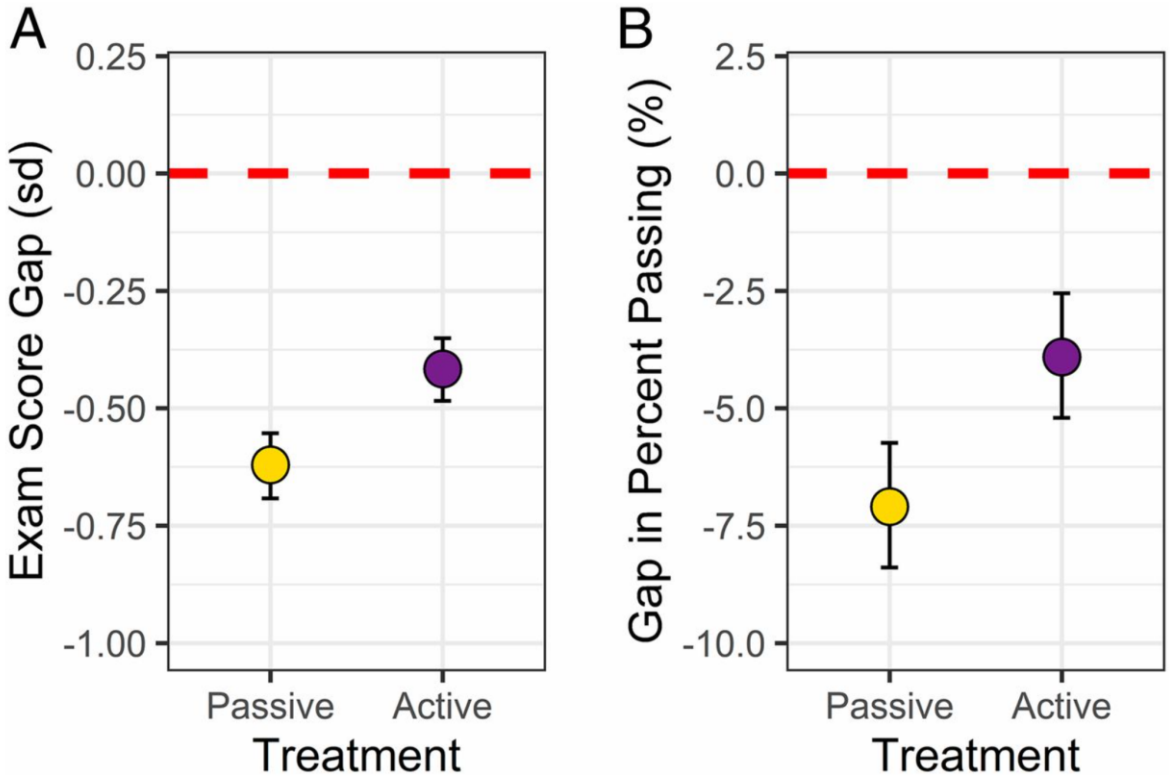
Interactive Learning

Reduces Failure Rates



See: Freeman, et.al. (2014)

Narrows Achievement Gap



See: Theobald, et.al. (2020)

Activity: How are you incorporating (or planning to incorporate) interactive learning in your classroom?

Reflect

Share in the Chat (optional)

Education, Learning and Social-Behavioral Sciences

IMPLICATIONS:

Applying what we know about learning is essential:

Personal and Academic Support

Psychological Safety

Affective Domain

Student Support is Essential

Academic Support

Classmates and faculty:

Help students succeed academically.

Personal Support

Classmates and faculty:

Care about and are personally committed to the **well-being** of each student.

The greater the social support,

the greater the academic challenges may be.

See: Johnson, Johnson and Smith (2006)

https://advances.asee.org/aee-covid-19-home-page/

Creative Tension Between Challenge and Security

PSYCHOLOGICAL SAFETY	ACCOUNTABILITY FOR MEETING DEMANDING GOALS: LOW	ACCOUNTABILITY FOR MEETING DEMANDING GOALS: HIGH
HIGH	**Comfort Zone** People really enjoy working with one another but don't fell particularly challenged. Nor do they work very hard.	**Learning Zone** The focus is on collaboration and learning in the service of high-performance outcomes.
LOW	**Apathy Zone** People tend to be apathetic and spend their time jockeying for position.	**Anxiety Zone** People fear to offer tentative ideas, try new things, or ask colleagues for help

See: Edmonson (2008)

See also: Pelz and Andrews (1966); Pelz (1976)

Integration of Information, Communication, and Computational (ICC) Technologies

DELIVERY: Television, Video Tape & Internet

Personal Response Systems (clickers)

Computational Technologies

Simulations

Individualized Feedback

Intelligent Tutors

Grading

Games and Competitions

IMPLICATIONS:

Technology provides affordances to mediate learning—but education is a human activity.

Prior Shifts

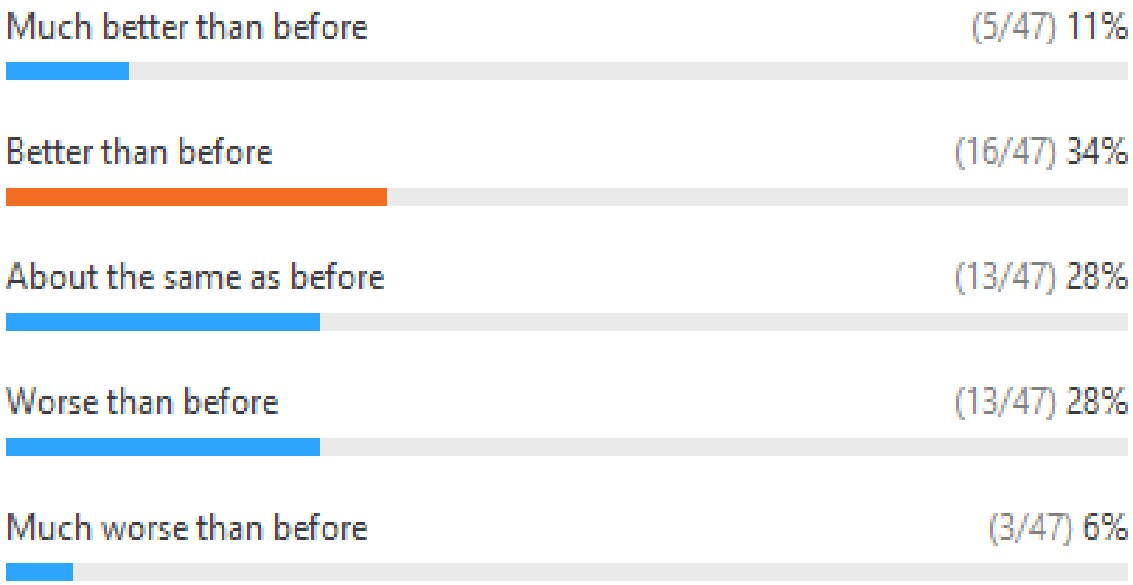
- Were prompted by outside forces
- Were met with resistance
- Were eventually embraced (to varying degrees)
- Did not change core values/practices

Engineering Education Reports

Mann Report (1918)	Wickenden Report (1930)
Hammond Report (1940)	Grinter Report (1955)
"Goals" Report (1968)	Green Report (1994)
Innovation with Impact (2002)	Educating the Engineer of 2020 (2005)

https://www.asee.org/member-resources/reports

Poll: How is remote teaching/learning going (compared to pre-pandemic)?



Ubiquitous Remote Teaching and Learning

Emergency Remote Teaching

Effective Distance Education

IMPLICATIONS:

Engineering teaching and learning can be accomplished remotely—but there are challenges:

- Video conference fatigue
- Lack of human/social interaction

Videoconference (Zoom) Fatigue

Close-up eye contact is intense

- Take Zoom out of full-screen mode
- Stir far away from the screen

Seeing your face all the time is exhausting

- Hide yourself from view.

Sitting still and talking is unnatural

- Create more space between yourself and the camera (e.g., get a keyboard).
- Turn off the camera

Cognitive load is at maximum

- Turn off the camera—give yourself an audio-only break.
- Turn your entire body away from the screen.

https://tmb.apaopen.org/pub/nonverbal-overload/release/1

Lack of human/social interaction:

"Higher levels of **group belongingness** are the most consistent protective factor against videoconference fatigue."

https://digitalcommons.odu.edu/management_fac_pubs/38

Emphasis on Justice, Equity, Diversity, and Inclusion

Be Identity-conscious

Be Relational

Be Transparent

Be Accessible

Be Proactive

Be Flexible

"Do the best you can until you know better. Then when you know better, do better."

—Maya Angelou

IMPLICATION:

Working towards creating and maintaining equitable and inclusive learning environments is imperative.

https://www.celt.iastate.edu/wp-content/uploads/2020/06/Equity-and-Inclusion-in-the-Online-Learning-Environment.pdf

Be Proactive (Remote Learning)

- Pay attention to warning signs and reach out.
- Use formative assessment and make completion required.
- Know what resources are available.
- Prepare students for varying delivery modes.

Become an Ally

Apathetic

Not understanding of the issues

Aware

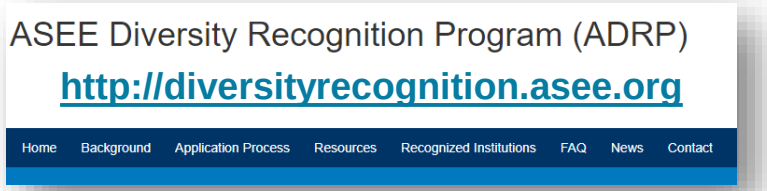
Knows basic concepts, not active

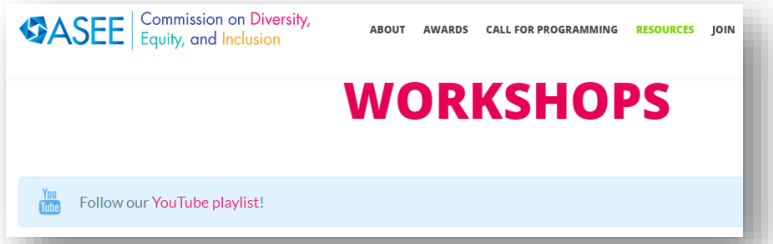
Active

Well-informed, sharing & seeking when prompted

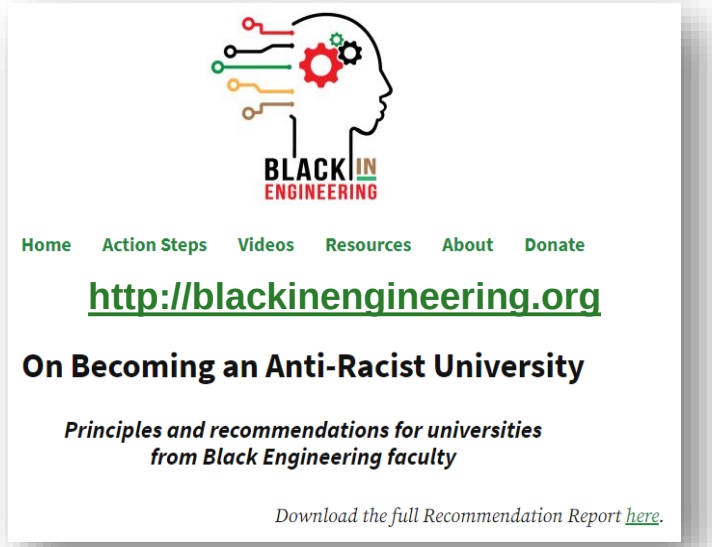
Advocate

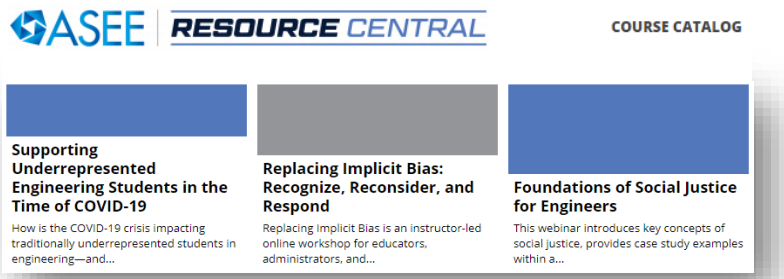
Committed proactive champion





http://diversity.asee.org/deicommittee





http://resources.asee.org/course-catalog

http://advances.asee.org

Shifts in Engineering Education: Implications

Engineering Science

Theory and research matter.

Outcomes Accreditation

Identifying and articulating enduring outcomes is a critical part of effective course design.

Engineering Design

Embracing the engineering design process for course design makes sense.

Social Sciences

Applying what we know about learning is essential:

Cognitive Domain

Affective Domain

ICC Technologies

Technology provides affordances to mediate learning—but education is a human activity.

Remote Learning

Engineering teaching and learning can be accomplished remotely—but there are challenges.

Justice, Equity, D&I

Working towards creating and maintaining equitable and inclusive learning environments is imperative.

PRIOR SHIFTS

EMERGING SHIFTS

Prior Shifts

- Were prompted by outside forces
- Were met with resistance
- Were eventually embraced (to varying degrees)
- **Did not change core values/practices**

Post-Pandemic

What do we want to keep?

Thank you!

ASEE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

/karl-smith-5581401

/rocio-chavela

ksmith@umn.edu

r.chavela@asee.org

karlsmithmn.org

asee.org

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