SHARED CHALLENGES AND COLLECTIVE RESILIENCE IN GLOBAL ENGINEERING EDUCATION

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WHAT IS INDUSTRY 4.0?

- Industry has added automation, AI, IoT, and more
- Impacts on engineering practice:
  - AI literacy
  - Systems Thinking
  - Collaboration
  - Ethical reasoning
- Mismatch with traditional education
  - Rigid curricula
  - Siloed disciplines
  - Outdated assessment

INTRODUCING UNIVERSITY 4.0

Category	University 3.0 (Traditional)	University 4.0 (Emerging Model)
Curriculum	Fixed programs, front-loaded theory	Modular, adaptive, real-world integrated
Credentials	One-time degree	Stackable microcredentials & lifelong learning
Teaching Approach	Lecture-heavy, faculty-centered	Active, tech-enhanced, learner-centered
Technology Integration	Supplemental (e.g., LMS, projectors)	Core to delivery (AI, VR/AR, simulations, digital twins)
Assessment	Exams and letter grades	Competency-based, real-time feedback
Industry Connection	Occasional internships or guest talks	Co-designed programs, live projects, embedded partnerships
Disciplinary Structure	Siloed departments	Cross-disciplinary, problem-driven learning
Access & Flexibility	On-campus, fixed schedules	Hybrid/online, self-paced, flexible pathways
Faculty Role	Knowledge provider	Coach, co-designer, facilitator
Purpose	Train professionals for stable careers	Prepare agile learners for uncertain, evolving futures

GLOBAL INNOVATIONS AND MODELS

- Notable Examples
  - Microcredentials (Australia & Europe)
  - Immersive VR labs (South Korea & the U.S.)
  - Industry-Integrated Capstones (Germany) and Industry-Integrated Degree Programs (England & Canada)

- AI enhanced learning environments
  - Adaptive tutoring systems
  - Automated feedback and diagnostics

BREAKING SILOS & IMPLEMENTING CHANGE

- Common Barriers
  - Accreditation constraints
  - Faculty reward systems
  - Departmental silos

- Strategies for Change
  - Cross-disciplinary curriculum teams
  - Co-design with industry and alumni
  - Piloting flexible modules within existing structures

THE ROLE OF PROFESSIONAL SOCIETIES

Catalyst for change

- Providing frameworks, tools, and peer learning networks

Examples

- Accreditation reform efforts
- Microcredentialing initiatives
- Faculty development in emerging tech

OUR VISION

Excellent and broadly accessible education empowering students and engineering professionals to create a better world

OUR MISSION

ASEE advances innovation, excellence, and access at all levels of education for the engineering profession.

WE NEED TO UPDATE THE WAY WE TEACH ENGINEERING

- The Engineering Mindset Report was published in 2024

- A vision for change in undergraduate engineering and engineering technology education
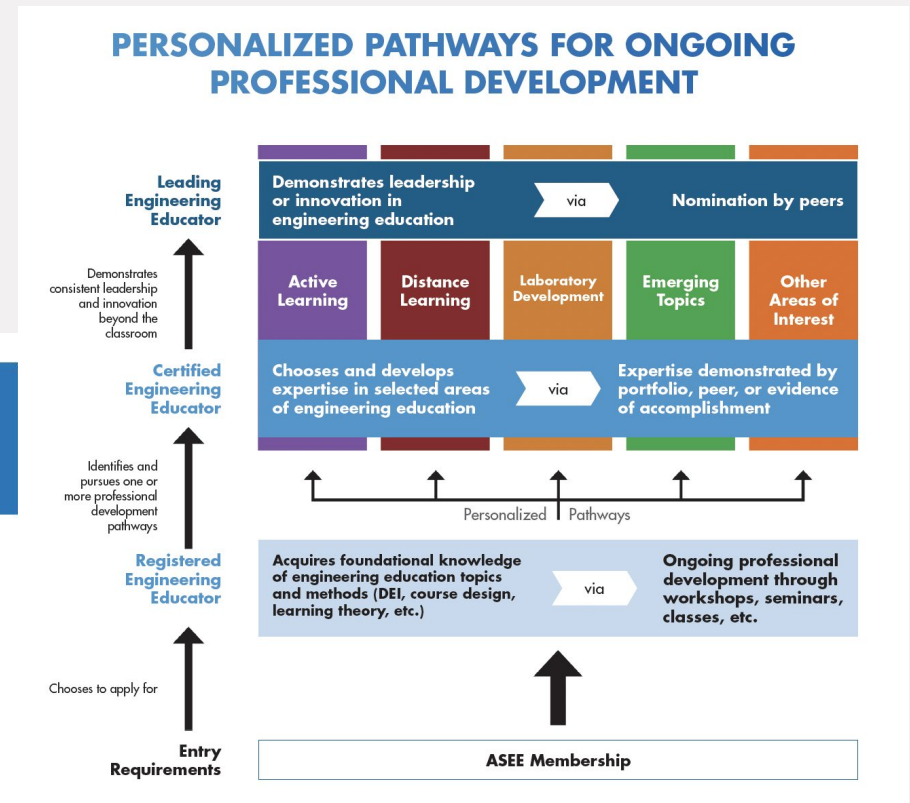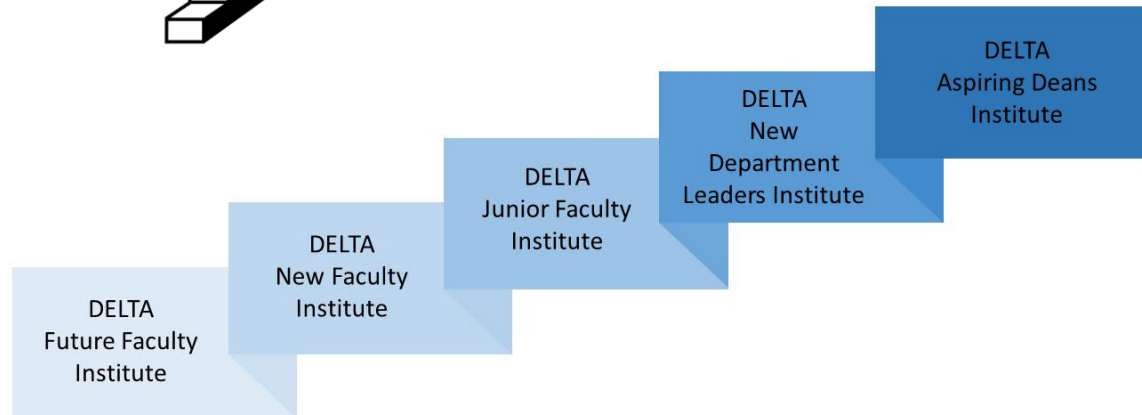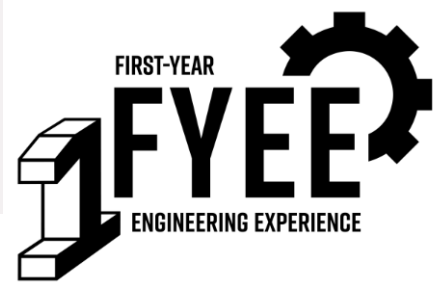
PROGRAMS TO SUPPORT INDUSTRIAL PARTNERSHIPS

ASEE's **Corporate Member Council** fosters dialogue between industry and engineering educators

SHARING BEST PRACTICES FOR TEACHING & LEARNING

MENTORSHIP PROGRAMS

PROGRAMS TO SUPPORT
P-12 ENGINEERING EDUCATION

- Framework for P-12 Engineering Learning

- Engineering Teaching Professional Development Standard

- Engineering Teaching Professional Development Endorsement

- Safety in P12 Engineering Classrooms and Labs booklet

IN CONCLUSION

- Our professional societies play a vital role in developing the workforce of the future by
  - Encouraging a broader group of young people to consider a career in engineering
  - Providing support as they move through their career
  - Developing an inclusive environment for students and faculty
  - Re-evaluating how we teach engineering

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RESOURCES

- Mindset_Brochure.pdf (asee.org)