BEEC Share and Learn Report: November 2026

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Topic: Workshop: Industry-informed courses and workforce ready skills development

Resources:

- BIEE Journal Publication: https://link.springer.com/article/10.1007/s43683-025-00171-z
- ASEE 2025 Conference Paper: https://peer.asee.org/biomedical-engineering-master-s-aligning-programs-with-industry-and-academic-stakeholder-needs
- "The Goal" Manufacturing Book by Eliyahu M. Goldratt: https://www.amazon.com/clp/1565114248?lv=shuf&channelId=500
- CATME Teamwork Software: https://catme.org/login/index
- List of Books for Industry Skills (e.g. Lean Six Sigma): https://docs.google.com/document/d/1GWqsYXunWySHMpAhgZ4L7vTZnQDDZeuEkrowzH8Lga8/edit?tab=t.0#heading=h.ycs8q1mmut85

Discussion and Lecture Notes:

Lecture Notes:

- Ways to identify employer valued competency, how to design a student deliverable, and how to assess an authentic industry work product and observable criterion
- Value added for Master's program, Master of Engineering + Master of Science, skills from 30 industry leaders and 25 academic advisors identified included verbal communication, engineering design, problem solving, teamwork, and initiative
    - Can be expanded to undergraduate and graduate
    - Note that this is focused on medical device industry
- Gaps Identified: manufacturing processes, design controls/traceability, drafting and engineering documentation, regulatory affairs, quality systems
- MEng at Clemson – building a design history file through series of 5 gates: discover and define, translate to requirements, test, assess risk, redesign, refine and scale thinking, final package and handoff
- Method for redesign at two scales: what do students currently do and submit? What work behavior should they learn and perform? What deliverable would industry recognize and value?
- Example: case study on Risk Management in MedTech – Theranos case study. Assessment is a written case study report and class presentation.
    - Make more industry centric: "Why did Theranos fail? What were the technical and regulatory issues?"
        - Instead: Identify facts vs uncertainties, prioritize patient safety and quality risks, recommend next steps for company
        - "You are on the engineering quality review team, your leadership is concerned by reliability and adequacy of device documentation" – perform risk and evidence assessment of controls in place, do a quality gap and action plan for containment and corrective steps, write executive memo on judgement, and then do an in class mock review and defend decision
- Instead of explaining deficiencies and discuss consequences of failure, evaluate evidence strength and uncertainty, prioritize patient and quality risks, make management decision with tradeoff, and defend decision
- Other example – align entire program with industry needs in broad setting
    - Current types of courses: technical content, single instructor, centered around specific subfield in BME, traditional assessments with papers, presentations, design projects, etc.
    - Change of these courses: industry-skill reframing of courses – invite guest speakers from industry to supplement technical information with career paths and roles, guest speakers offer insights into careers across different sectors of BME, and final project is a student led interview with industry representatives

- New Industry Assessments: think about career mapping, written reflections, recorded interview and written summary, final interview presentation and structured peer review
- Breakout: adapt one industry practice, choose a course or assignment and design a feasible change and way to assessment: 1) Identify one employer valued competency, 2) Redesign one authentic activity or work product, 3) Assessment: how do you know if you are successful?