BEEC Share and Learn Report: March 2025

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Topic: ASEE Education Showcase Deep Dive: Creating Career Connections in Curriculum

Resources:

- Top Hat - https://tophat.com/ (polls)
- OnShape CAD - https://www.onshape.com/en/ (CAD)
- Biomedical Engineer Jobs Podcast: https://bme.unc.edu/podcast

Discussion and Lecture Notes:

Lecture Notes:

- Goal is to target BME industry relevant skills, educate students about career titles
- Context: junior level hands-on laboratory experiences with lab skills and equipment as well as technical writing and communication, statistics, data analysis, and experimental design
- Day 1 of Class: Applied Medical Quality Engineer II position – read through job description and ask if you feel qualified for this job – entry level BS BME job
- Ask using Top Hat if they feel qualified on first day and last day of class
- Remind them of lab activities they did that makes them qualified, that you don't have to be expert at everything, show particular language and jargon and what can be learned on the job vs. think about what
- Show them types of jobs available for entry BME – quality engineering, team player, research skills, technical communication are most important job responsibilities, 44% entry level BME jobs require some type of quality engineering but also build skills in above 4 skills
- Other class: job posting for Airman Accommodation Laboratory (AAL) Position – read through description, but highlight later what's important – skills that people hiring our students will want include things we can make course activities to – e.g. measuring on humans, quantifying data, digital human monitoring and 3d models
    - Job ads can help us adjust our learning modules to learn information needed for the jobs
    - Example: anatomy lab assignment where they develop "3d software programs as well as digital human modeling" by analyzing joints or cardiovascular models from CT and MRI images and make recommendation for prosthetics based on size or make decisions to "validation of human system models"
    - Use engineering tools to learn about anatomy and relate it back to how they will be used in BME careers
- Evaluations showed that students appreciated that the course objectives directly match job descriptions
    - Also allowed students to be more aware of job titles and communicate relevance of skills to students
    - Motivates students to understand need for research skills even if they go into industry
    - Motivates students to learn about the content as they can see the relevance of what they learn
    - Allows them to put into words what they can put into their resume and interview from the skills they learned in class
    - Builds confidence that they can now apply for these jobs after taking the class

Discussion:

- CAD software used – SolidWorks in first year engineering, now uses OnShape (web browser based CAD)
- Do you get pushback since we have to cater to LOTS of career paths (e.g. grad school, medical school)? Technical writing is justified for industry and grad school (if it's not in a notebook then it didn't happen) and documentation is important for regulatory affairs. Documentation in med school is useful…
- Pre-post aspect of job ad to show professional skills learned and hope take away from the class – can you use this as a pre-post assessment for them to see if they can highlight the things they think they're taking away from

them to see if they have perceived effectiveness in the learning outcomes and which ones those would be. Them selves can go back and highlight what they find they learned. Similar to marketing research techniques, to see how they view things differently.
    - Other idea to create a completely new job and see if they meet it
- Have you done it for classes less easily attached to job applications? E.g. statics/biotransport/thermo/etc.
    - Anatomy class is early in curriculum but still worked, would require some thought on how to relate specific parts of the descriptions in these courses
- Have done first year seminar is to find jobs they find interesting to solidify if they're in the right major – have you gotten feedback from the students to see if they can confirm that they want to be in BME?
    - Lab class is junior level so pretty well into major. Anatomy class has non-majors, may help see if the course has changed whether they are in the right fit/major
- For "Maybe" responses, interviews on what it would take to change their mind?
    - Prior research has found that women are less likely to apply for jobs if they don't feel 100% qualified. It's possible there are some gender or other demographic biases towards answers that they may not feel qualified to apply if it's not 100%. There is a lot of jargon in entry level jobs and students need to expect to not know everything and will learn it on the job since it's impossible to learn everything in BME given how broad the field.
    - Potential follow up is to give a question on "because…" if they answer maybe or no…
    - Group work is done in classes like lab class and possible they are having others that are more confident in the topic do the work
        - Oral exams can help gain how much a student is understanding of a topic and their contributions to a project/lab
- Tried module in other institutions and classes and observed that it solidified that they did NOT want the job title (e.g. quality engineering)
    - Important for students to learn what they don't love just as much as what they do love
    - Quality engineering is not always the things you're doing day in and day out – for instance, in startups you will likely do other things as well
- How are people picking jobs? They are dissuaded by quality engineering jobs and many want R&D jobs which are not always available, and quality is where a lot of BME students are hired for.
    - We spend so much time on R&D and quality engineering skills that some BME students tend to view quality as too low a level and there's a mismatch of expectations
- Searching on job sites needs to be broad and need to come up with a good list of different titles that are relevant to BME as it's hard to find related jobs just by searching for "biomedical engineering"
    - Idea is to potentially come up with a good list of skills and expertise and search on those things rather than job title