

ENGAGE Strategy Research Brief

Everyday Applications to Teach Engineering Concepts

“I walked into my Mechanics of Deformable Solids class with my IPOD on and it immediately got the students’ attention. I used the IPOD to explain basic axial stress and deformation and how these concepts could be used to solve statistically indeterminate problems. Last semester I used two concentric metal bars as an example rather than the IPOD. The calculation for both examples was the same but when I used the metal bars no one cared. The IPOD headphone wire got their attention because several students had broken theirs and were curious why. Before the first exam I asked students what they would change about the lecture. About 25% of the students suggested adding more examples like the IPOD. I thought this kind of example would be fun, but it was more than that.”

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Creating interest and enthusiasm for engineering early on in the undergraduate curriculum is essential to students’ willingness to persist and remain in engineering majors. Using examples that are familiar to students enhances the likelihood that they will be interested in and better retain the information they learn (5). Authentic tasks that are intrinsically motivating will be most engaging (2). “Making an immediate connection to something real or familiar often motivates students to be engaged in their own learning because they are able to relate well with the object that embodies the phenomenon they are attempting to learn” (13). Students will continue a course of study if the work involves subjects and activities that interest them (11). Familiar applications that students can easily visualize will be more interesting to students than traditional or more abstract examples such as automobile applications or boiler pipes. More interesting applications might include exploding coke cans or hot dogs, musical instruments, salt-water taffy, bicycles, or avalanches (3,9,13). Real-world industry examples may also be more motivating and intriguing to students than abstract problems (1,13).



Differences in how women and men perceive and value the role of technology in society are well documented (6, 10,12). Women often emphasize the social function of technology over the technology itself. This includes the use of technology to enhance social networks, communication and collaboration, and to improve quality of life. This holistic approach to solving problems includes an emphasis on both contextual and technical factors (7,10). Women often report that they are attracted to engineering because of their desire to help people and society. Highlighting simple and complex ways that engineers help society makes classroom lectures and discussions matter to students. As a result, students become more invested in what they are learning and as a result persevere. Engineering curricula need to take this perspective into consideration when aiming to attract and retain students, particularly female students (7). This is especially important with the critical foundation topics covered in first and second year engineering courses. In one study, introducing everyday applications in courses resulted in students reporting greater interest and more learning. Students assigned a greater value to these courses than those using traditional examples. Students also rated faculty more favorably in their evaluations when everyday examples were used (4).

ENGAGE will work with teams from 30 engineering schools to implement *Everyday Applications to Teach Engineering Courses* in 1st and 2nd year engineering courses as a strategy to improve retention among undergraduate engineering students. A library of *Everyday Applications* will be developed and posted on the ENGAGE website.

References

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