Chemical Engineering Colloquium

December 6, 2023

Goddard Hall, Room 227

12:00 PM – 12:55 PM

"The Intersection of the Technical and Behavioral: Novel, Game-Based Approaches to Teaching Complex Engineering Topics"

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Game-based educational techniques can be an interesting and novel approach to active learning in engineering courses. Because games often exist within their own rule sets, they can allow students to explore scenarios and make choices that they wouldn't otherwise make because they are appropriate within the context and the rules of the game. In this talk, we discuss two different projects involving game-based learning. In the first, we explore multiple game-based approaches to teaching engineering ethics to first-year engineering students in a multidisciplinary setting. At the beginning of the semester, students are given a baseline survey to quantify the sophistication of their ethical reasoning. Over the course of the semester, different game-based interventions are given to the students, and the survey instrument again is used to determine any changes in their ethical reasoning. The game-based interventions by their nature allow students to explore ethical reasoning in the context of behavioral ethics. In the second project, we discuss the development and use of a digital educational environment to explore process safety judgments with senior chemical engineering students. Our research team developed a survey instrument to gauge the sophistication of student thinking about process safety. Students completing the survey instrument and then completing similar scenarios in the game show statistically significant differences in the types of responses they make, indicating that different reasoning modes may be activated by the game due to its more authentic and realistic portrayal of the material.

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