CONOCOPHILLIPS LECTURESHIP SERIES IN CHEMICAL ENGINEERING EDUCATION

ARCHITECTURE 170
SEPTEMBER 29, 2025
3:00-4:00PM

DANIEL D. BURKEY

Castleman Term Professor of Engineering Innovation
Associate Dean of Undergraduate Education and Diversity
Graduate Director of the Engineering Education Ph.D. Program
University of Connecticut

THE INTERSECTION OF THE TECHNICAL AND BEHAVIORAL: NOVEL, GAME-BASED APPROACHES TO TEACHING COMPLEX ENGINEERING TOPICS

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.

Daniel D. Burkey is the Castleman Term Professor of Engineering Innovation, Associate Dean of Undergraduate Education and Diversity, and the Graduate Director of the Engineering Education Ph.D. Program at the University of Connecticut. Dr. Burkey holds his B.S. in Chemical Engineering from Lehigh University in Bethlehem, PA, his M.S.C.E.P. and Ph.D. in Chemical Engineering from the Massachusetts Institute of Technology, and an M.A. in Educational Psychology from the University of Connecticut. Prior to UConn, he held positions at Northeastern University and at GVD Corporation in Cambridge, MA. Since joining UConn in 2010, Dr. Burkey's area of research has focused broadly on engineering education, and specifically on moral and ethical development of engineering students, process safety education, and game-inspired educational techniques. Dr. Burkey currently serves as a Director of the Education Division of AIChE, where he runs the Future Faculty Mentoring Program. He is a past program chair of the ASEE Chemical Engineering Division and serves as an assistant editor of the journal Chemical Engineering Education. In 2020, he was inducted into the Connecticut Academy of Science and Engineering (CASE) for his contributions to engineering education in the state. In addition to his many teaching awards, Dr. Burkey is also the recipient of the 2020 AICHE Education Division Innovation Award, the 2021 ASEE Corcoran Award for the best paper in Chemical Engineering Education in the previous year, the 2023 David Himmelblau Award from the CAST Division of AIChE for innovations in computer-aided chemical engineering education, and the 2025 AIChE Education Division Award for Excellence in Engineering Education Research. He was inducted as a Fellow of AIChE in 2024.

LIGHT REFRESHMENTS TO FOLLOW AFTER THE SEMINAR

SCHOOL OF
CHEMICAL ENGINEERING
College of Engineering, Architecture and Technology

ConocoPhillips