

**2018 Cal Poly Pomona Meeting
Symposium Abstracts**

04 Advances in Engineering Education Symposium

Creating an Online Engineering Video Library at a State University, **PAUL NISSENSON and NOLAN TSUCHIYA** (Department of Mechanical Engineering, Cal Poly Pomona, 3801 W Temple Ave, Pomona, CA, 91768; pmnissenson@cpp.edu, ntsuchiya@cpp.edu).

This talk will discuss the creation of a video tutorial library by the Mechanical Engineering Department at California State Polytechnic University, Pomona (Cal Poly Pomona), which is a primarily undergraduate institution. The library was started in 2013 and currently contains over 400 original videos covering topics in statics, dynamics, fluid mechanics, thermodynamics, and many other subjects. Eleven instructors have contributed to this library by either developing original content or allowing their lectures to be recorded. In addition to full-length lectures, the library contains numerous short videos covering single topics and example problems. The videos are hosted on the department's YouTube channel and organized on a locally hosted website named ME Online (www.cpp.edu/meonline). All videos are closed captioned and available to the public. At the time of writing the YouTube channel has over 2 million views and 18000 subscribers.

Videos from the library have been repurposed for flipping a computer programming course and fluid mechanics course, as well as teaching a massive open online course, and the department plans on using the videos for experimenting with a supplemental instruction pedagogical model. A survey was administered to undergraduate students at Cal Poly Pomona to gauge the impact of the video library on their academic career. Information was gathered on awareness of the video tutorial resource, frequency of viewing by students, frequency of use by instructors, feedback about the video library, and other topics.

Flipped Classroom Pedagogy, **ROSANNE WELCH** (MFA in Screenwriting Program, Stephens College and Interdisciplinary General Education Department, Cal Poly Pomona, 3801 West Temple Ave, Pomona, CA 91768; rosanne@welchwrite.com).

Based on my nearly 20 years of working to advance creativity in college classrooms both among students and faculty, this presentation will focus on the pedagogy of the flipped classroom and how that particularly suits science and engineering students in classes outside their discipline – and inside it as well.

The presentation will offer definitions and examples of ways to use well studied pedagogies such as flipping the classroom, Socratic seminars and on hands on exercises. By practicing creativity and highlighting the relevance of each lesson presented, students own much more of the information than when relying on lectures and test-based assessments. That is not to say those do not play a part in these pedagogies, but they are not the only way to educate millennials.

Puzzles Principles, **KAMRAN ABEDINI** (Department of Industrial and Manufacturing Engineering, Cal Poly Pomona, 3801 West Temple Ave, Pomona, CA 91768; kabedini@cpp.edu).

Puzzles Principles application to enhance learning of science in institutions of higher education. Many strategies have been utilized to enhance the learning process. Puzzles Principles methodology utilizes systems engineering to design the network of various elements introduced to students in higher education institutions leading to proven greater transfer of knowledge and improvement in student success.

Framing – An Effective Pedagogical Approach, **MARIAPPAN JAWAHARLAL** (Mechanical Engineering, Cal Poly Pomona, 3801 West Temple Ave, Pomona, CA 91768; jmariappan@cpp.edu).

Cognitive scientists have studied how framing influences our thought process and reasoning. People think in terms of frames, and facts do not work in deeply framed ideas.

Scientists have studied the impact of frames and it was found that framing might have an even stronger effect on our reasoning than our own personal, political, social, and moral views. The framing approach is heavily used in marketing where customers' habits, emotions, age, gender, imagery, and a host of other factors are collected, analyzed, and utilized by marketing and PR firms. Interestingly, framing approach has not been used in education to our knowledge. In this paper, we will present how framing approach has been applied to teach engineering mechanics in a classroom with examples. Framing approach is very effective, and it can change the way we view a subject matter and traditional teaching.