

2012 ASEE Chemical Engineering Summer School Poster Session

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Poster Title: A Simulation Platform to Enhance Engineering Laboratory Experiences

Abstract: maximum 300 words

Engineering laboratory experiences are expensive to build and maintain. Common complaints from students include broken equipment, rigid operating procedures, and excessive manual effort to collect quality data. Physical systems provide an opportunity to troubleshoot when things go wrong, analyze noisy or corrupt data, and allow hands-on learning. An alternative approach preserves these features while supplementing with simulation. On the other hand, a purely virtual experience opens the student to new applications that would not be feasible for many university laboratories. The APMonitor Modeling Language is in use by thousands of researchers and students to study dynamic systems such as Unmanned Aerial Vehicles (UAVs), exothermic chemical reactors, solid oxide fuel cells, electric vehicles, and population disease transmission. In one particular case, a chemical reactor experiment as part of a unit operation lab formerly required 20 hours to collect data for the design problem. Using a virtual replicate of the reactor, the students first designed the reactor experiments in simulation to optimize the information content. This Design of Experiment (DOE) reduced the operation time to 1 hour while achieving the same objective. Supplementing the experimental portion with a virtual system helped the students gain greater insight and maximize the laboratory learning experience. A growing library of shared dynamic mathematical models and the web-based platform are a resource to enhance engineering laboratory experiences. More information is available at <http://apmonitor.com>.

Please contact Sundar Madihally sundar.madihally@okstate.edu for questions. We look forward to interacting with you during the week.