Using a Game Based Learning Tool in a Freshman Chemical Engineering Course

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Problems that chemical engineers face on a daily basis involve many unknowns that need to be optimized. To initiate this concept early on in chemical engineering curricula, a game based software (developed by Professor TWF Russell, University of Delaware, http://www.mht.che.udel.edu) was used as a part of an introductory freshman class at the University of Massachusetts Lowell. The course was presented over a two week period with a lecture flowed by a lab session during each week. The students were in small groups in the lab session (instructor to student ratio 1:9) and each had an access to a computer. In the first lecture, the students were introduced to the concept of reactor design reviewing the batch reactor analysis from the freshman chemistry course. The students then worked in the lab session to develop the reactor model equations for continuous flow reactors using the drag and drop menu in the computer program (http://www.mht.che.udel.edu/activities.html). As homework, each student was assigned a different problem to estimate the volume of the reactor for a specified production rate. In the second week, the "game" (http://www.mht.che.udel.edu/graded/game.html) was introduced where the aim is to design and operate a chemical reactor with highest profit to competitively produce a commodity chemical. The concept of taking a technology from laboratory to manufacturing was demonstrated using this web based game and the concepts of interpretation of experimental data, modeling, optimization and using market information were emphasized. The procedure followed and the results obtained will be presented along with student survey outcomes.

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