
The ASEE Annual Conference is the only conference dedicated to all disciplines of engineering education. As the premier event of its kind, the ASEE conference is committed to fostering the exchange of ideas and enhancing teaching methods and curricula. The conference features more than 400 technical sessions, with peer-reviewed papers spanning all disciplines of engineering education.

The paper presents the results of the authors’ work in thermo-fluids and simulation courses. Dr. Wright implemented a Collaborative Project (CP) with a simulation component, as a High Impact Practice into a Thermodynamics I course. Data collected in post-requisite Thermodynamics II and Fluid Mechanics courses indicated that CP students were more likely than non-CP students to express that they understood thermodynamics, liked thermo-fluid courses, and were excited to use simulations. Students that were re-exposed to the use of COMSOL Multiphysics® in Fluid Mechanics with Inquiry-Based Learning (IBL) component were even more likely to express affinity for thermo-fluid courses and future use of engineering software, with the CP students in those sections expressing the most positive responses.

Fig. 1: Student work using COMSOL Multiphysics® software: “Water Purification Reactor”.

Thermo I:
CP Students vs. Non-CP Students
As part of my Thermodynamics I course, I had a CP, which required me to work in a group with some of my classmates over the duration of the semester to complete an engineering design project. I understood Thermodynamics I.

Fig. 2: Impact of Collaborative Project (CP) on Thermodynamics I Students

Fluid Mechanics:
IBL Students vs. Non-IBL Students, also broken down by Thermo I CP
I like thermo-fluids courses in engineering such as thermodynamics, fluid mechanics, and heat transfer. I am excited for opportunities to use software, such as “COMSOL” in future engineering courses.

Fig. 3: Impact of Inquiry-Based Learning (IBL) and previous Thermodynamics I CP experience on Students in Fluid Mechanics.