327c Adoption of a High Performance Learning Environment (Hi-Pele) in a Capstone Process Instrumentation and Controls Course

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Traditional classroom lectures / activities in senior level Process Controls classes tend not to promote ABET criteria such as (b) an ability to design and conduct experiments, as well as to analyze and interpret data, (i) a recognition of the need for, and an ability to engage in life-long learning, or (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. This contribution discusses the experiences and lessons learned during the first adoption of a High Performance Learning Environment (Hi-PeLE) [1] in a capstone Process Controls class at Mississippi State University.

Hi-PeLE is a flexible learning tool that can accomplish numerous ABET criteria and can potentially be adapted to a variety of courses and learning environments either as small projects, semester-long projects or variations of these two limiting cases. Hi-PeLE puts the students on the driver seat of the learning process and this focus brings the students to achieve higher levels of competence in a given subject, of maturity in the handling of abstract principles, and of motivation to become life-long learners. In short, the approach helps students to accomplish many of the ABET criteria identified above.

The specific goals of the Hi-PeLE project as they related to the Controls project were to a) replace recipe-like experiments with a focus on the discovery process using unfamiliar temperature control equipment, b) lead the students to sequentially plan tasks and meet deadlines in a structured team environment, c) facilitate student's rediscovery of the “adventure of figuring things out.” The project was organized into three phases; Phase 1 was dedicated to background research and defining the project, Phase 2 was to focus on developing model equations and running the experiment, while Phase 3 included data analysis, synthesis of ideas, and producing a final concluding report for an instructor. The teams were selected following a functional-based team member selection approach [2] and were comprised of three students. Each student had the opportunity to be a leader for a phase of the project and a supporting team member for the other two phases.

In this contribution the authors will discuss the merits of Hi-PeLE and comment on their experiences associated with applying the learning tool. Recommendations for future adoptions of Hi-PeLE will be given and student evaluations of the Hi-PeLE team learning experience will also be discussed.

References:

1. Arce, P. and L. Schreiber, “High Performance Learning Environments, Hi-PeLE,” Chemical Engineering Education, Fall 2004 Issue, 286-291.

2. Sauer, S. and P. Arce, “Team Member Selection: A Functional-Based Approach,” Annual Conference Proceedings, American Society for Engineering Education, ASEE, 2004.