The Learning Factory – 10 Years of Impact at Penn State

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Abstract *—The Learning Factory at Penn State is a university-industry partnership established to integrate design, manufacturing and business realities into the engineering curriculum. This is accomplished by providing real (industry-driven) projects, a curriculum in Product Realization, and a state-of-the-art, hands-on learning laboratory. The Learning Factory began in 1994 as the result of a NSF/ARPA grant from the Technology Reinvestment Program. It has continued to grow and prosper long after the initial grant ended. In ten years of operation, the Learning Factory has generated over $5M to support hands-on learning activities and projects, facilitated over 400 inter-disciplinary capstone design projects for 120 corporations and non-profits institutions, and provided real-world educational experiences for over 8,000 students. The fundamental innovations of the Learning Factory that have had the greatest impact at Penn State are:*

1) ***Facilities:*** *The Learning Factory <www.lf.psu.edu> is an open-access, active learning laboratory, where students, faculty and industry from all disciplines can "roll up their sleeves" and practice real engineering. It provides practical training and modern facilities for design, prototyping, manufacturing, testing and re-design. These facilities support numerous student design competition projects and enable faculty to integrate engineering practice into their courses.*
2) ***Industry Interaction:*** *The Learning Factory provides an efficient infrastructure for actively involving industry in the educational process through sponsored capstone design projects, curriculum improvement, and engineers in the classroom.*
3) ***Curriculum:*** *The Product Realization Minor comprises three elective courses that cover product dissection, concurrent engineering, and engineering entrepreneurship, in addition to required courses in manufacturing processes, quality control, and the capstone design course. The Minor averages more than a dozen students each year from IE, ME, EE, and Engr Sci and has served as the benchmark for several new minors within the College of Engineering, including minors in Leadership and Entrepreneurship.*

In this paper, details of these successes are presented, along with lessons learned.

Index Terms *— Capstone design, industrial collaboration, integrating engineering practice, multi-disciplinary design projects*