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Abstract**

Development of engineering professional abilities in a co-curricular program for engineering sophomores

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Like many engineering schools, MIT found itself faced with the challenge of providing engineering students with an educational program that develops an ever-broader range of technical and non-technical abilities. With the primary curriculum already overloaded, the School took an alternative approach. Launched in 2002, the Undergraduate Practice Opportunities Program (UPOP) is a new co-curricular program for sophomores that provides professional engineering experience and develops students' non-technical professional abilities. The UPOP program goal is to integrate three essential parts of effective learning: knowledge, experience, and reflection. UPOP consists of: 1) Knowledge 1- The program begins with an intensive week of engineering practice "boot camp" during the January intersession and is led by engineering and management faculty. Through active case-based and role-playing learning sessions, students gain practical knowledge and appreciation for interpersonal and presentation skills, leadership, professional ethics, organizational dynamics, product development, and statistical quality control; 2) Knowledge 2- In Spring, students attend alumni-led workshops on career development; 3) Experience- In Summer, students complete 12 weeks of employment where they will be able to realize UPOP's educational objectives; 4) Reflection 1- During Summer, students complete a structured journal that permits exploration of engineering teamwork, communication, and organization; 5) Reflection 2- In Fall, students meet to discuss their experiences with other students and faculty. Assessment and evaluation of the new program included activity feedback surveys, student pre- and post-activity ability self-assessment surveys completed by UPOP students and a control group, employer survey of student performance, and performance scoring of student journals. Analysis of data revealed student improvement in many key non-technical professional abilities such as teamwork, presentation, identification of customer needs as part of the product development process, and comprehension of organization dynamics and strategy concepts compared with the control group.