Guest Editorial

In his editorial in Vol. 24, No. 5 of 2008, IJEE the previous Editor-in-Chief the late Professor Michael Wald called for "more specific archival publications of education research applied to engineering education practice." He went on to say, "It would be good to see engineering education publications picking up some research results from engineering and education fields and applying them to engineering practice." These special issues are the result of that inquiry and our purpose is to help bridge the gap between researchers and practitioners by providing specific examples of effective applications of engineering education research. Given the wealth of excellent contributions, our final 27 papers are appearing in two issues. In the previous issue, there were 15 papers focusing on "Developing Engineering Competencies," and this issue features 12 papers that address "Building Engineering Communities".

Building Engineering Communities

Engineering is a social activity often performed in teams with the goal of solving a problem for people, and the 12 papers that comprise this issue focus on building engineering communities. The issue includes papers that offer a broad conception of the global engineering education community, present efforts to engage young people in engineering, describe learning as a social endeavor, and address social impact directly such as sustainability and ethics. As was the case with our first issue, the papers here give an international perspective, with authors from New Zealand, Russia, Spain, Switzerland, and the U.S.A.

Engineering education is emerging as a discipline unto itself, and the first two papers of this special issue offer a sense of the global range of such activities. Dobryakova and Froumin describe the evolution of engineering education in Russia, while Benson and her colleagues write about the formation of several departments of engineering education as well as centers or other "hybrids" in the U.S.A.

Bringing young people into engineering is essential for the survival and continued growth of the field and efforts to engage pre-college and undergraduate students are the focus of the next four papers. Tran and Nathan examine the relationship between enrollment in a pre-college engineering course (Project Lead the Way) and students' achievement in science and math. Next, Klein and her colleagues present their use of Legacy Cycle (in which traditional lectures are paired with interactive hands-on activities) to develop effective innovative hands-on materials to teach high school and undergraduate students about biomedical imaging. Then Ellis, Rudnitsky, and Moriarty describe their work in which incorporating a narrative theoretic story in a sophomore mechanics course and an upper-level modeling elective resulted in increases in student learning and engagement. Finally, Reed-Rhoads and her colleagues describe how new approaches to the first year college experience require innovative learning spaces, learning technologies, and engagement of students in the learning process.

The next four papers focus on learning engineering as a social endeavor. Benson and her colleagues describe their successful student-centered activities for large enrollment undergraduate programs (SCALE-UP) approach to statics, dynamics, and calculus courses and integrated curricula. Drawing from constructivist learning theories, Brown and Poor incorporate peer-tutoring into active learning exercises to enhance student learning, self-efficacy, and attitudes. McCarthy uses both Social Learning Theory and Communities of Practice as components of a pedagogical framework for the design of an innovative manufacturing systems course. And finally, Gillet moves beyond the classroom to describe a vision of using social software for personal learning.

The final two papers in this special issue address the social context of engineering directly. In an effort to move students to the higher levels of Bloom's Taxonomy, Franquesa and his colleagues describe a service learning personal computer recycling project where students obtain insights into the social and environmental impact of technology. Finally, Carpenter, Harding, and Finelli confront the issue of ethics among engineering undergraduates and draw on ideas of engineering culture and student psychology to offer suggestions for promoting integrity in the curriculum and the classroom.

Again, we would like to thank all of the authors and reviewers for their valuable contributions to this special issue. We are grateful to Amy Kao-Webster for her assistance and Editor Ahmad Ibrahim for his support. In fulfillment of Professor Wald's vision, we look forward to the papers in these special issues serving as catalysts for continued discussions on the applications of engineering education research. We are thankful for having had this opportunity to collaborate on this important endeavor.

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