Editorial

This issue of the IJEE includes contributions from authors in Canada, Denmark, Greece, Hong Kong, Iran, Israel, Korea, Lithuania, Mexico, Taiwan, Turkey, Spain, UAE, UK, and USA. They address a variety of topics including: Outreach Activities, First-Year Programs, Aspects of Project Work, Design Methodologies, University–Industry Cooperation, Professional Skills and Competencies, Women in Engineering, Architectural Engineering, Failure Analysis, Digital Signal Processing, Part Visualization, Biomedical Engineering, Online Learning, Virtual Laboratories and Instrumentation, Simulations, Neural Networks and Data Mining.

Outreach activities are addressed by the first two papers. In the first, Sham et al. present an outreach program to stimulate the interest of high-school students in engineering. Students participated in numerous activities including lectures, a guided hands-on project, and technically-oriented field trips. The impact of the program was assessed through a students' survey. In the second, Verner et al. discuss robotics programs aimed at motivating young people to study robotics. The approach was based on the collaboration of robotics experts from industry and academia. Robotics was introduced through exhibitions and educational programs.

Enrollment and persistence trends among first year students in electrical and mechanical engineering are examined by DeJong et al. Data analyzed include transcript information and student surveys for students enrolled in an introductory engineering course during a six-year period.

The next three papers relate to project work and design. Bjørner et al. present case study results from Medialogy, a cross-disciplinary program aimed to facilitate creativity in project work. They examine the perceptions of students regarding various aspects of the approach and its impact. Mikellides et al. present a study of the effectiveness of teaching engineering analysis of mechanical systems through a stand-alone project course. The course includes pre-project lectures that relate closely to the project on which students will work; a competition amongst the student teams was also included. The impact on learning was assessed through pre- and post-project tests. Dhaouadi et al. discuss an approach to instill design skills through a sequence of structured, guided, and open-ended design experiences throughout the undergraduate curriculum. The impact of the approach was assessed for a group of students studying control systems by pre- and post-project surveys.

Some aspects of the industry-university relationship are discussed in two papers: Soltani et al. discuss issues related to the relationship between employers and students during their undergraduate study. The study is based on data collected from engineering undergraduates, industry, and academic staff through questionnaires, interviews and documentary analysis. Guler and Mert evaluate some civil engineering internship programs through statistical analysis of survey data. They identify factors contributing to students' satisfaction and elements that could help improve civil engineering programs.

Professional skills and competencies are discussed in the next three papers. Franklin et al. examine the perception of graduate students about the importance of skills such as written and verbal communication skills, team building and leadership, and the understanding of relevant global issues. They present a comparative study from three disciplines to quantify these perceptions. Shyr presents a study to establish and verify a set of working competency items considered important for energy technology based on industrial requirements. Lord et al. investigate student outcomes, including life-long learning, for a variety of active learning pedagogies in ten courses taught by four different instructors.

On the topic of women in engineering, Ngambeki et al. suggest that since personal interests are a key element in encouraging careers in engineering, a lack of interest may contribute to the underrepresentation of women in engineering. For that reason, they investigate the predictive validity of the person-thing orientation (PTO) instrument among college students and their relations to academic majors and career choices across three cultural contexts: Greece, Turkey, and the USA.

Continuing with cross-cultural investigations, Jodko and Parasonis present a comparative analysis of the curricula of Architectural Engineering undergraduate programs in several countries. Elements of comparison included: study length, number of credits, courses, and electives. There is a wide spectrum of opinions in academia regarding what constitutes Architectural Engineering.

Teaching methods are discussed in the next four papers. Arlitt and Grantham investigate the hypothesis that expert knowledge can be utilized to provide sufficient preparation for novice engineers to perform tasks that could otherwise require a substantial amount of experience. They evaluate Risk in Early Design (RED) resources that enable this teaching method. Rangel-Magdaleno et al. propose a hardware digital signal processing course in which theory and practice are linked. The course was assessed from both a pedagogical and industrial point of view through the use of two surveys. Uria et al. present a learning method for part

visualization. They developed an activity program to assimilate the process that takes into account the difficulties that students encounter. The impact on learning was assessed four times over a period of two years using tests and surveys. Rodriguez et al. advance a new approach to teach the basics of the formation of the intra- and extra-cellular potential around a fiber. The approach impact was assessed through a combination of a written examination consisting of ten questions, each of which corresponded to one of the learning objectives and a student questionnaire.

Computer-based learning, virtual laboratories, and simulations are discussed next. Yang et al. report on a computer-based online learning module, designed to help engineering undergraduates learn difficult concepts in the thermal and transport sciences. The design of these modules is based on relevant research on cognitive psychology and technology-enhanced learning. The impact on learning was assessed through students' surveys. Yalvac and Ayar discuss the nature (how and why) of five university professors use of wikis in education to help with understanding and improvement of student-centered teaching practices. Bingol and Pacact present a virtual laboratory based on a neural network controller (NNC) training set for DC converter-fed Permanent Magnet Direct Current (PMDC) motor as a part of the electrical machinery courses. Schreuders and Lammi study the cognitive and affective domains of achievement in engineering laboratories while employing computer-based and traditional oscilloscopes. The students' knowledge and attitudes were assessed through a survey. Park investigates the use of a manufacturing activity simulation board as a teaching tool in order to provide engineering students with the basics of cost accounting. The impact of the simulation on learning was assessed through a two-section examination; one to test basic terminology and concepts and the other relates to industry cases.

The final paper by Bilgin presents a framework designed for educational data mining and to help teachers in the knowledge discovering process. The framework was assessed using synthetic and actual data sets.

I wish to thank all the authors for their valuable contributions. I hope the readers find this issue of the IJEE interesting, useful and thought provoking.

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